STRATEGIC ARMS INTERACTIONS: 1945-1961

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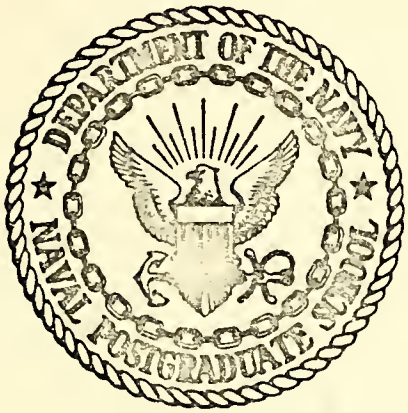

THESIS

Strategic Arms Interactions: 1945-1961

by

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Throughout the period 1945-1961 the Soviet Union was strategically inferior to the United States. The Soviets sought to redress this imbalance, and the United States endeavored to remain superior. An examination is made of each major strategic arms innovation, in context, to determine its relationship to the action/reaction process. No single pattern of interaction is recognized, but one unmistakable characteristic does emerge. The United States consistantly reacted strongly even when enjoying a decisive

weapons margin if a threat were perceived to its strategic superiority.

Strategic Arms Interactions: 1945-1961

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ABSTRACT

Throughout the period 1945-1961 the Soviet Union was strategically inferior to the United States. The Soviets sought to redress this imbalance, and the United States endeavored to remain superior. An examination is made of each major strategic arms innovation, in context, to determine its relationship to the action/reaction process. No single pattern of interaction is recognized, but one unmistakable characteristic does emerge. The United States consistantly reacted strongly even when enjoying a decisive weapons margin if a threat were perceived to its strategic superiority.

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I. INTRODUCTION

Pre-World War II U. S. military strategy was, in the main, based on geographic remoteness. It was felt that any future war would begin because of some act beyond the control of the United States, and it would occur overseas. The prevailing balance of power would require some time to be upset, and the vastness of the oceans would allow time for the United States to mobilize and bring its industrial potential to bear.

After World War II plans were made to fight the next war in terms of World War II. Deficiencies that had existed were corrected, but their appropriateness to the Cold War situation, if any, was purely a matter of luck.

With the advent of the Cold War something else was called for. Modern technology had reduced the vastness of the oceans, and weapons were becoming available which promised damage of a much higher order in relation to the effort required in their delivery. The old balance of power concept deteriorated in the ashes of post-war Europe and left in its place a vast power vacuum. After Stalin's February 1946 speech there was little doubt that the Soviet Union was a contender to fill that vacuum. If the Soviets were to be confronted anywhere on the globe it had to be by the United States. This meant an end to the historic U. S. policy of isolation between wars. The Soviets could not be confronted and contained by a mobilization strategy dependent on time to prepare armed forces and industry.

To halt the Soviet advance another strategy was required. The first proposed was the "Containment Thesis," suggesting that the Soviets could only be dealt with from a position of strength. The strength called for was "balanced" forces in order to blunt any Soviet probe at the time and place of occurrance. Economy-mindedness prevented the development of the "balanced" forces believed required, so the strength to meet Soviet threats came from the nuclear delivery systems of the United States. Until about 1950 substantial nuclear systems were not truly forces in being either, however. More and more reliance became placed on the "bomb," and delivery capability was expanded until the strategy evolved into one of deterrence.* The nuclear forces in being were then believed strong enough to deter Soviet encroachment. When the forces were strong enough, that strategy was articulated as "massive retaliation." Any Soviet threat would be met with instant and overwhelming force, aimed at the Soviet Union.

The reliance placed by the United States on its deterrent force also became a source of extreme sensitivity. The United States lacked the conventional forces to meet the

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*A military strategy of deterrence dissuades an opponent from attacking by holding out to him the sufficiently great probability that he will suffer a net loss as a result of an attack. A strategy of defense is designed to reduce one's own losses. Deterrence, therefore, reduces the probability of being attacked, while defense reduces the consequences of being attacked. For further discussion of deterrent strategies see Snyder, Glenn H., Deterrence and Defense, Princeton University Press, Princeton, New Jersey, 1961.

Soviets in the field and relied almost exclusively on the threat of "massive retaliation." This meant that any menace to the delivery system placed the entire American strategic position in jeopardy. Consequently, any Soviet move that threatened the ability of the United States to "massively retaliate" brought about a reaction frenzy.

In the action/reaction process of an arms race, each opponent views certain acts of the other as threatening and reacts accordingly. Some actions can set off a lengthy chain of reactions. Others cause no reaction. The U. S. - Soviet arms race was not a classic, such as the 1904-1914 Anglo-German Dreadnaught competition where each side responded by building more and bigger battleships. There is a high degree of consistancy, however.

Some strategic arms actions resulted from evolutionary changes to existing systems. In other cases new technology led to the development of a system, although not necessarily to the purchase of significant quantities. Occasionally there was a hardware reaction to a political development, and on at least one occasion public pressure brought about a large reaction despite opposition by the leaders. Hardware reactions were in the form of additional procurement of existing systems, development of new systems, or expediting development and/or procurement.

Throughout the period covered by this paper, 1945-1961, the Soviets were in a position of strategic inferiority. They sought first to counter the ability of the United States to strike them with impunity, and then they sought a deterrent

force of their own. The steps taken by the Soviets in the pursuit of these goals caused the interaction process that became the post-World War II arms race.

This paper will be concerned with the interaction process involving only strategic systems in the purist sense. The interaction of conventional and/or tactical forces will be minimized. The paper is divided chronologically into four periods, separated by significant events which set the tone for the following years. An attempt is made to examine each major strategic arms innovation, in context, to determine if it were a part of the action/reaction sequence or the result of some other stimulus.

II. NUCLEAR MONOPOLY 1945-1949

A. THE IMPACT AND DEVELOPMENT OF NUCLEAR WEAPONS IN THE UNITED STATES

The first five years of the "Atomic Age" were dominated by the United States in terms of nuclear weapons development, production, and deployment. It was a period in which, for the most part, the United States failed to fully appreciate or utilize the monopoly that existed, placing remarkably little military or political importance on the early nuclear devices. This was due, to a great extent, to the conclusions reached by the United States Strategic Bombing Survey published shortly after the war. The most widely held interpretation of this report credited little importance to allied strategic bombing in forcing the capitulation of Germany or Japan. Despite this, the temporary postwar monopoly of nuclear weapons was

the basis for the United States' policy of containment of the Soviet Union. The concept of nuclear deterrence gradually found its way into American thinking in the late forties, but a full-blown doctrine of deterrence through retaliatory attack and the development of forces and bases to give it real meaning still lay largely in the future.[1]

In the early period of nuclear monopoly the ability of the United States to construct and deliver a workable device was a historical fact. They had detonated the world's first nuclear device on July 26, 1945 near Alamogordo, New Mexico, and later on 6 August and 9 August dropped bombs on Hiroshima and Nagasaki, Japan respectively.[2]

As overshelming as this advantage might appear, the ability to explode three weapons did not mean that they were being mass produced. A nuclear monopoly did exist but the ability to exploit it was limited. The first production run of nuclear weapons, in the last months of the war, appears to have been planned for no more than twelve devices. With the dropping of the bomb on Nagasaki there was only one completed weapon remaining in the nuclear arsenal. Production and assembly of weapons thereafter proceeded very slowly, and stockpile numbers

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[1]Wolfe, Thomas W. and Ermarth, Fritz, The Interaction Process and Its Influence on Major Soviet Arms Decisions, Rand Corp., R-1180-PR, Santa Monica, Cal., 1973, p. 22.

[2]Hewlett, Richard G. and Duncan, Francis, Atomic Shield 1947-1952, The Pennsylvania State University Press, University Park, Pa., 1969, pp. 672-673.

undoubtedly fell far short of those reported in the press in the late forties.[3]

Two bombs were detonated at Bikini in 1946 to determine the effects on warships[4] and possibly to demonstrate that the United States was still in the business. This occurred shortly before the Baruch Plan* was presented to the United Nations. None was detonated in 1947. Despite the fact that new facilities were being put into use throughout the post-war period, production lagged, a result of a critical shortage of qualified personnel. In 1948 the total American stockpile of nuclear

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[3]Precise numbers of weapons constructed and stockpiled are not available. These were not written down for security reasons, and even the President received stockpile figures in verbal briefings. There is evidence, however, that in this period, given the planned wartime use and construction capacity of the day that the initial production run was for twelve weapons. (See "The Balance of Military Power," The Atlantic Monthly, June 1951, vol. 187, no. 6, pp. 21-27.)

[4]Hewlett, Richard G. and Anderson, Oscar E., Jr., The New World 1939-1946, The Pennslyvania State University Press, University Park, Pa., 1962, pp. 624-625.

*The Baruch Plan was a postwar proposal presented by the United States. It involved supervised abolition of nuclear weapons, to be accomplished by an international monopoly for nuclear research and production for non-military purposes, the monopoly to be free of any national veto. The Soviets rejected the plan. (See Quester, George, Nuclear Diplomacy, The Dunellen Company, Inc., New York, 1970, pp. 18-23.)

weapons was probably under 150 warheard, and perhaps under one hundred.[5]

B. EARLY SOVIET EFFORTS IN NUCLEAR WEAPONS DEVELOPMENT

For the Soviet Union the war in June 1941 forced a re-allocation of available resources to the resistance of the German war machine. This essentially brought an end to a progressive and active program of nuclear research in the Soviet Union, a program which had been in effect since the early thirties and had closely paralleled the Anglo-American program in the pre-war years. There is evidence that the year 1940 was the high point in the early history of Soviet nuclear physics. They were beginning extensive radiochemical studies and conducting experiments on the nature of the fission process, gaining conclusive proof of the spontaneous fission of uranium in that year.[6]

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[5]By 1948 some newspaper accounts placed the number of Hiroshima size nuclear weapons as high as 2,500. At the end of the war large numbers of skilled workers and scientists returned to the private sector, and the more inefficient production facilities of the Manhattan Project were shutdown. Program management was transferred from the Army to the Atomic Energy Commission. Additionally, all weapons made prior to mid-1948 were hand-made, laboratory models-Mark 1 or Mark 3's. The "Sandstone" test series in April and May 1948 was to prove the feasibility of the Mark 4, the first assembly-line weapon. The test series was nearly called off due to the Berlin crisis to conserve the three "Sandstone" weapons. This does not connote a large stockpile. (See Questor, op. cit. pp. 4-6; Hewlett and Duncan, op. cit., pp. Hewlett and Anderson, op. cit., pp. 134, 159, 175, 176.)

[6]In 1938 or 1939 control of nuclear research in the Soviet Union was transferred to the Academy of Sciences where it enjoyed the "favor of the government." In this position it was able to accelerate its activities reaching a peak in late 1940 with a promise of even more to come when the war broke out in mid 1941. (See Arnold Kramish, Atomic Energy in the Soviet Union, Stanford University Press, Stanford, 1959, pp. 14-30.)

Soviet nuclear development halted with the German invasion and was not reinstituted until 1943. The parallel development which existed up to this point can be misleading and distorted if viewed against the background of a race for military weapons in the postwar period. The Russians may, in fact, have considered themselves in a race with the Western world during the period 1930-1941, but it does not necessarily follow that the goal they had in mind was an atomic bomb. Neither the Anglo-American nor, so far as available evidence shows, the Soviets had made such a decision by the middle of 1941. The final decision to engage in a weapons development program was not made by the United states until November 1941 after nearly two years of painstaking inquiry and difficult deliberation. By this time the Soviet Union had already been forced by circumstances beyond its control to stop or postpone its nuclear research program.[7]

Following the demonstration by a Western scientist that a nuclear chain reaction was possible, the Soviets reinstituted a small nuclear program which was probably confined to the monitoring of Western technology. On December 2, 1942, at the University of Chicago, Enrico Fermi achieved the world's first chain reaction and as the culmination of three year's labor, showed the possibility of "transmutation of atoms on an industrial scale." Until that time it was not at all certain

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[7] Ibid., p. 34.

that a chain reaction could even by achieved.[8] Probably as a direct result of the successful work at the University of Chicago the previous year, the Soviets had reinstituted a full-blown research program in nuclear energy by the fall of 1943.[9]

The American nuclear test at Alamogordo on July 26, 1945, proved forever that a bomb would work. It also offered a glance at the Soviet public attitude toward nuclear weapons. At the Potsdam meeting in 1945, Truman announced to Stalin that "we have an entirely novel form of bomb, something quite out of the ordinary, which we think will have a decisive effect upon the Japanese will to continue the war."[10] To the surprise and probably disappointment of both Truman and Churchill Stalin acknowledged the statement and said he hoped they would use the new weapon but asked no further questions about it and dropped the subject. In retrospect we know that the Soviet Union had been kept abreast of the Anglo-American

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[8]In 1966 famed Soviet physicist, Igor N. Golovin, in an interview with the New York Times stated that "Moscow ordered an all-out effort to build an atomic bomb in the summer of 1942, when German troops had overrun much of European Russia." This early bomb decision date for the Soviet Union is almost universally rejected in the West given the strain on the Soviet wartime economy and the lack of possible short-term results from such a program and given the absence of the proof of the possibility of even obtaining a chain reaction. Soviet survival was paramount in the immediate future and this did not depend upon the long-term development of a new weapon. (See Kramish, op. cit., pp. 63, 100 and New York Times, August 19, 1966, p. 1.)

[9]Kramish, op. cit., p. 97.

[10]Ibid., pp. 78-79.

nuclear development program through effective espionage efforts. At this time, however, Stalin had probably not yet been informed of the Alamogordo test which was conducted eight days earlier. It was this same enigmatic countenance which was to reflect the official Soviet government attitude toward the development of nuclear energy at the end of the war, at least as it was presented to the public. Pronouncements of the Soviet Union on nuclear weapons in the period 1945 to 1949 consistantly labeled them as useless and militarily insignificant, incapable of reversing the outcome of any war.[11] In public the atomic bomb was generally given no credit for the Japanese surrender, this being ascribed instead to the Soviet entry into the war.

Following the Alamogordo test Stalin apparently decided to accelerate the Soviet program despite the proclaimed position which downplayed the importance of such a device.[12] Work continued on the military nuclear program, but it was advertised as being directed solely at industrial and medical uses. Official dissatisfaction with the lack of progress in the program was demonstrated in 1947 when "a number of specialists who had been working on atomic projects were

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[11]MacKintosh, J. M., Strategy and Tactics of Soviet Foreign Policy, Oxford University Press, New York, 1963, p. 90.

[12]Soviet physicist, Igor N. Golovin disclosed in 1966 that Soviet scientists were ordered to accelerate their efforts following the 1945 Alamogordo test in the United States. (See New York Times, August 19, 1966, p. 1.)

arrested for negligence and lack of results."[13] Later that same year Molotov announced to the world that "the USSR knows the secret of the atomic bomb."[14] By that time the development of a group of atomic weapons for aircraft and missile delivery had become the most important of all Soviet military requirements.[15]

Although 1947 is the year in which the Soviets chose to claim they developed the atomic bomb--based on what they felt was their ability to proceed with development and construction confidently*--the source of Molotov's statement more than likely

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[13]An indication of the state of affairs in 1947 comes from Colonel G. A. Tokaev, a Soviet jet and rocket expert who escaped to the West in 1948. Beria, head of the MKVD, took personal control of nuclear research and, according to Tokaev, a number of specialists who had been working on atomic projects were arrested in 1947. (See Kramish, op. cit., pp. 109-110.)

[14]Molotov's statement of November 6, 1947, that there was no longer any "secret about the atomic bomb," was seen merely as a claim that the Soviet Union had learned the technique of nuclear production. (See New York Times, November 7, 1947.)

[15]Kilmarx, Robert A., A History of Soviet AirPower, Fredrick A. Praeger, New York, 1962, p. 219.

*"This claim is illustrative of the retrospective and quantitative projections that have been characteristic of many of the Soviet claims of arms superiority. Soviet disclosure philosophy seems to consider that once a certain qualitative stage is reached--that is, when it is known how to proceed and a weapon is effectively under production--then this automatically implies possession of the weapon. Consistant with this philosophy, an announcement of a weapon capability also usually falsely implies that the Soviet stockpile of that weapon is boundless, or at least sufficient. It is peculiar how Western reaction bolsters the operation of such a crude propaganda device. For it seems that some Western observers may be prone to express skepticism of a particular Soviet development, but, once it has been developed, the same observers automatically assume the validity of anything else rumored or stated about the weapon." The above described interaction is one we will see repeat itself time and again throughout the text of this paper. (Kramish, op. cit., p. 122.)

stems from the development and operation of the Soviet's first reactor which came into operation about August 15, 1947, with their first successful chain reaction.[16] Two more years passed before the Soviets are known to have detonated their first nuclear device. It had only been under the urging of Admiral Strauss of the AEC that the United States had finally instituted a program of reconnaissance flights which led to the detection of a Soviet nuclear detonation which had occurred on August 29, 1949.[17] The Soviets had now officially entered the nuclear age.

C. POSTWAR STRATEGIC POSITION

The end of World War II found the West clamoring for disarmament at a time when the Soviet military strength still appeared to be quite impressive. Having determined that any rollback of Soviet influence was not feasible, the United States and the Truman Administration were still determined to resist Soviet expansion. Such determination manifested

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[16] The exact date of the Soviet nuclear reactor start-up has not been disclosed, but the Soviets claim it was in operation prior to the start-up of the British reactor on August 15, 1947. (Ibid., p. 114.)

[17] On 3 September 1949 a WB-29 weather reconnaissance plane picked up measurable radioactivity at an altitude of 18,000 feet east of the Kamchatka Peninsula. The sample was inconclusive, but several special flights were launched for additional samples over the Pacific, and other routine flights began to report high levels of radioactivity. The radioactive cloud was tracked across the United States, and the British were requested to assist tracking it across Europe. The results were conclusive. (See Hewlett and Duncan, op. cit., pp. 362-365.)

itself in 1947 after the collapse of British support of the Greek and Turkish governments. The immediate response of the United States was a proclamation of an "anti-aggression" "Truman Doctrine," followed by the Marshall Plan.[18]

The world situation had thus set the stage for the post-war American foreign policy which was to receive definition with the 1947 "Sources of Soviet Conduct" article by George Kennan. This came to be known as the "containment thesis."[19] This article did little more than articulate the general feelings which had become more prevalent in the United States and had already been expressed by Forrestal and others. It was this famous article which was to later form the substance of NSC-20--a recognition of the threat and acknowledgment of the

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[18]On February 21, 1947 the British government informed the United States that it could no longer afford to support Greece and Turkey--both formerly in her sphere of influence. This de facto British abdication precipitated the Greek-Turkish Aid Program, more commonly known as the Truman Doctrine. This was a military-economic program designed to "put the world on notice that it would be our policy to support the cause of freedom wherever it might be threatened." On March 12, 1947, Truman went before Congress and asked for $400 million to get the program started. The Marshall Plan, or European Recovery Program, followed the Truman Doctrine and essentially was a program offering financial assistance to all countries which were struggling to rehabilitate their economies after the war. (For a more detailed explanation see Phillips, Cabell, The Truman Presidency, MacMillan Co., New York, 1966, pp. 167-194; Rosser, Richard F., An Introduction to Soviet Foreign Policy, Prentice-Hall, Inc., Englewood Cliffs, N. J., 1969, pp. 241-245.

[19]"The Sources of Soviet Conduct" first appeared under the authorship of "X." It has generally been acknowledged that X was, in fact, George Kennan. For the full text of his containment thesis see "The Sources of Soviet Conduct," Foreign Affairs xxv (July, 1947), pp. 566-582.

conditions in Europe. It outlined most of the military requirements of a strategy of deterrence to support a policy of containment.[20]

In this post war period both the United States and the Soviet Union developed dissimilar theories of deterrence, a result of circumstances and tradition. The United States had just come out of a war with a massive strategic bomber force. They possessed a working doctrine of strategic offensive warfare, a strategic bomber force with extensive operational experience, and the ability to produce nuclear weapons. The ingredients for an intercontinental nuclear delivery capability were at hand.[21] The Soviets, on the other hand, posed no serious strategic bomber threat. During the war they had only a small, ineffectual, and seldom used long-range bomber force. Furthermore, it was to be at least another four years before they were to possess a deliverable nuclear weapon. At this stage they were then forced to maintain a large standing army to counterbalance the strategic threat of the United States.*

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[20]Huntington, Samuel P., Common Defense, Columbia University Press, New York, 1961, p. 40.

[21]Wolfe and Ermarth, op. cit., p. 29.

*The Soviets saw themselves in a position where they had no direct means of deterring an American nuclear attack from 1945 to 1955. The only means available to the Soviet Union to prevent such an attack was to increase the strength of their land army to a point where it could not possibly be challenged on the Eurasian land mass. They proceeded to do just that. The Soviet army increased in size from a low of 2.8 million men in 1948 to over 5.7 million men by 1955, the size they felt was sufficient to guarantee Soviet security even if attacked first. Not until 1955 when the Soviets had their first operational intercontinental bombers did the force levels start to go down. (See Bottome, Edgar M., The Balance of Terror, Beacon Press, Boston, 1971, p.4)

D. EARLY SOVIET STRATEGIC BOMBER FORCE DEVELOPMENT

Forced to create a bomber force almost from scratch, the Soviets elected to take the shortest route available. By confiscating three American B-29's which had landed in Siberia following raids on Japan in 1944, they were able to bypass the usual research and development time. Copies of this B-29, redesignated the TU-4, were in production in five different plants by early 1946[22] and made their public debut in a fly-over at the 1948 May Day parade. In March of 1946 the Soviet Long Range Air Force (the counterpart to SAC and known as the DA) was reconstituted as a separate force.[23] Although lacking a nuclear weapons capability, a proven tactical doctrine, forward basing, an air refueling capability, and with little strategic bombing experience the Soviets

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[22]Large scale production, by early 1946, of this long-ranged four-engined bomber near Moscow, Kajan, Kiev, Novasibirsk and Tashkent was underway, although large scale delivery did not take place until 1948, at which point production was running from 25 to 50 aircraft per-month. This was made possible after three B-29's force-landed at an airfield near Vladivostok and were interned by the Soviets. See Lee, Asher, ed., The Soviet Air and Rocket Forces, Frederich A. Praeger, New York, 1959, p. 107; Lee, Asher, The Soviet Air Force, Gerald Duckworth and Co., Ltd., London, 1950, p. 177; and Kilmarx, op. cit., p. 230.

[23]It is interesting to note that SAC also came into being in March 1946. (See Lee, The Soviet Air and Rocket Forces, p. 172.)

constructed 1000 TU-4's, none of which were capable of reaching the United States on a round trip mission.[24]

E. SOVIET AIR DEFENCE DEVELOPMENT

At about the same time that the Long Range Air Force was reestablished, PVO Strany (Air Defence of the Homeland) gained a new emphasis. With this new surge the Soviets initiated competitive aircraft design programs for a jet fighter which produced the MIG-15 of Korean War fame. This aircraft was first flown in December 1947.[25] It is doubtful that the Soviet Union would have been able to produce this particular jet fighter at this time had not the British, in early 1947, sold them 55 Rolls-Royce centrifugal-type, turbo-jet

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[24]The Soviet TU-4 had a maximum combat radius of less than 1,500 miles, which meant they could hit no major U. S. cities from existing Soviet bases on a round-trip mission. They could, however, hit most cities in Europe if flying from forward bases. The Soviets, unable to develop suitable jet engines in the postwar era, were completely unsuccessful in their efforts to develop a long-range jet bomber. The possibility of the Soviets launching a preemptive, one way mission against the United States was given serious thought, particularly in the 1948 political crisis. (Quester, op. cit., p. 40, and Lee, Soviet Air and Rocket Forces, pp. 107-108.)

[25]The MIG-15 was first test flown in 1947 and began series production by the end of 1948. By 1949 it was appearing in large numbers in Germany. Although the MIG-15 was ultimately the most successful of the early series of point defense jet fighters, it had been preceeded by the YAK-15 and MIG-9. These, even with the captured German jet engine technology proved to be underpowered. (See Lee, The Soviet Air Force, p. 196; Lee, The Soviet Air and Rocket Forces, pp. 135-140.)

engines.[26] The Soviets had been the only major combatant to come out of World War II without having developed a turbo-jet engine of their own.[27] The imported British technology gave the Soviets the propulsion system needed for their first modern jet fighter.* The importance placed on the defence of the homeland against the United States strategic threat is reflected not only in the considerable expenditures allocated from an already strained economy on a radar warning system but also in their ultimately producing some 15,000 of the MIG-15 aircraft.[28]

F. POSTWAR UNITED STATES STRATEGIC BOMBER FORCE: CREATION, EXPANSION AND USE

Following the war the major concern in the United States was for demobilization. No threat to the national interest was perceived, and the masses were anxious to return to a postwar normality. Although research and development continued, driven mostly by technology, few large governmental purchases of new materials were made. The Strategic Air Command (SAC)

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[26] Lee, The Soviet Air and Rocket Forces, p. 137.

[27] Ibid., p. 134.

*At the war's end the Soviets captured intact several jet engine production plants in Poland and East Germany. Additionally they captured thousands of jet engine technicians, who were resettled in the Soviet factories, and hundreds of German jet and rocket fighters. By 1946 they were producing their own jet engines and aircraft which were wholesale reproductions of German models. For a more complete breakdown see Lee, The Soviet Air Force, pp. 190-194; The Soviet Air and Rocket Forces, p.134-136.

[28] Quester, op. cit., p. 41.

was brought into existence in March 1946, but at its inception it consisted of only nine bombardment groups of B-29's and B-17's. Of these, only the 509th Composite Group was equipped and trained to deliver nuclear weapons.[29]

Postwar misunderstandings and belligerence started the move from research and development to actual procurement. In 1947 SAC started to expand, and in that year its strength reached 16 bombardment groups. At that time a goal of 21 bombardment groups by January 1949 was set--a goal which was met on schedule.[30]

Early expansion of SAC was achieved by recalling aircraft from storage. Further expansion came as research and development decisions were turned into "buy" decisions with the follow-on to the B-29, the B-50 (about 75% redesigned), being delivered in SAC in 1948. Larger and faster aircraft were also on the way. In 1941 the decisions had been made for the development of the B-36. The decision to develop the B-47 came in 1944. The B-36 first flew in 1946 and the first of what was

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[29]At the time SAC was given the nuclear responsibility on May 1, 1946, it had only one unit, the 509th Composet Group, capable of nuclear weapons delivery and/or sustained combat operations-meaning it was the only unit up to strength (See Goldberg, Alfred, ed., A History of the United States AirForce 1907-1957, D. Van Nostrand Co. Inc., Princeton, N.J. 1957, p. 122.)

[30]To reach the expansion goal of 16 bombardment groups in 1947 SAC had to bring aircraft, all B-29's out of storage. This same procedure was to be repeated in 1948 and 1949 until they finally reached a strength of 21 groups in early 1949. The peak strength of 21 bombardment groups coinsided with the AEC decision to bring nuclear weapons production to a peak. (Goldberg, loc. cit., and Shulman, Marshall D., Stalin's Foreign Policy Reappraised, Harvard University Press, Cambridge, 1963, pp. 28f.

ultimately to be a buy of 325 aircraft was being delivered to SAC by 1948. Despite the fact that it first flew in 1947, the B-47 did not arrive in SAC until 1951.*

This was only an indication of what was to come. The United States had not yet entered into the arms race. These aircraft buys, while important, were relatively small in number.

The political crisis of 1948 served as the catalyst to launch the United States into a full scale race for the tape. Heightened senses were exacerbated when indigenous Communist forces, with the latent threat of the Soviet Army behind them, staged a coup d'etat in Czechoslovakia. Then, with Communist labor unions sabotaging and harassing the governments of France and Italy and the Truman Administration fearing that United States intervention might be necessary to prevent coups in those countries, the Soviets imposed the Berlin blockade.[31]

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*Although the decision to go ahead with development of the B-47 came in 1944 it did not pass its service flight tests until January 1953, nine years later. This greater than usual development time was the result of extensive modifications which were carried out to extend the range of this new bomber. An indication of just how extensive the modifications were, the weight of the aircraft almost doubled to the final gross weight of 175,000 lbs. Additionally, the first B-47's were to have straight wings, but an evaluation of captured German data caused the designers, in September 1945, to opt for a swept wing version, ultimately trying over fifty different positions and combinations of incidence before selecting the final location. (See Jones, Lloyd S., U. S. Bombers B-1 -- B-70, Aero Publishers Incorporated, Los Angeles, 1962, p. 161 and Goldberg op. cit., p. 207.)

[31]Quester, op. cit., p. 44.

Response to the Berlin blockade was not with American ground forces but rather by American airpower. Congress immediately passed a $3.5 billion supplementary defense bill with the highest priority going to aircraft procurement.[32] Large numbers of SAC bombers were then authorized and SAC continued to grow not only in strength but also quality as the new airframes arrived.

The United States responded to the Soviet's action in Germany by sending two additional squadrons of B-29's to Germany and two bombardment groups to Great Britain.[33] The configuration of these B-29's is unknown. It is quite possible that they had not yet been fitted and the crews trained to carry nuclear weapons. Furthermore, despite urgings from Defense Secretary Forrestal, Secretary of State Marshall, Air Force Secretary Symington, and the JCS that nuclear weapons be released to the custody of the Air Force, President Truman

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[32] In this case, as many more to follow, Congress demonstrated a willingness to spend, almost without question, as much as Defense or the individual service thought was needed when faced with a crisis. Secretary of the Air Force Symington by-passed both the Secretary of Defense and the President going directly to Congress to ask for more funding. Congress not only approved the funding but also authorized a 70 group Air Force. The President simply refused to spend the additional money and the most the Air Force ever saw was 59 groups. (See Millis, W. ed., The Forrestal Diaries, Viking Press, N. Y., 1951, pp.437, 414-415.)

[33] SAC had, for some time, been rotating B-29's in and out of European bases. This was the first time, however, they were rotated on a semi-permanent basis with the expressed purpose of conveying a nuclear threat to the Soviet Union. (Ibid., pp. 453-457, 491.)

refused to do so for domestic political reasons.[34] This deployment of bombers to Europe in the face of the Berlin blockade was the first explicit forward movement of what amounted to the American nuclear strike force. This bomber deployment clearly constituted a step upward in brandishing what was still an American monopoly.[35]

G. EARLY AIR DEFENSE EFFORTS IN THE UNITED STATES

The Air Defense Command was established in 1946 when the Air Force was reorganized along functional lines.[36] In spite of this there was an almost complete disregard for continental defense in the early postwar period. In 1947 the Air Force had submitted the "Supremacy" plan calling for 411 radar stations at a cost of $400 million, but the lack of a perceived threat caused rejection by Congress. As the Berlin crisis of 1948 developed the United States was operating only five World War II vintage radar stations, (four of which were in Alaska), on less than full time basis.[37]

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[34]This was just prior to U.S. elections, and President Truman felt he would be in a better position to turn custody of the nuclear weapons to the Air Force after elections, or at least to reconsider his decision. (Ibid., pp. 461, 490.)

[35]Quester, op. cit., p. 50.

[36]Goldberg, op. cit., p. 129.

[37]Robertson, Bruce, ed., United States Army and Air Force Fighters 1916-1961, Harlyford Publications Ltd., Letchworth, Herts, England, 1961, p. 97, see also Quester, op. cit., pp. 33-34, and Goldberg, op. cit., p. 130.

In response to events in 1948 the Air Defense Command was ordered to provide protection for the northeast and northwest portions of the United States. This coverage was later expanded to include the stockpile of nuclear weapons near Albuquerque, New Mexico. In the absence of a Soviet nuclear capability the TU-4 was not considered a significant threat to the United States. The possibility of one-way missions with conventional bombs created no real danger. The nuclear monopoly could last for years, but the Battle of Britain had indicated that effective defenses could not be created overnight. An expanded air defense system was necessary for training if for no other reason.[38]

Fearing that Congress would never approve the large expenditures called for by the "Supremacy" system, the Air Force prepared a modified "Permanent System" comprised of 75 early warning radar stations and ten control centers to be fully operational by 1952.[39] Congress provided funds for this compromise in 1949. To give protection in the interim, the Air Force expanded their meager, temporary network into a system called "Lashup." It was completed in 1950 by building installations on government owned land and diverting money funded for other purposes.

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[38] Ibid., p. 129

[39] Ibid., p. 130.

By early 1949 tensions appeared to be somewhat lessening. The Berlin blockade had ended on May 12, 1949, and the split between Yugoslavia and Moscow seemed to have eased much of the problem in Greece.[40] On the domestic scene the presidential elections were completed and the economy-conscious Truman Administration was pushing for a lowering of defense expenditures once again.* Such cuts in United States defense monies were undoubtedly welcomed with some sense of relief in the Soviet Union.

While concern still ran high in defense-minded circles, the crisis of 1948 and the threat that World War III might break out with "dramatic suddeness" had passed. Then on August 29, 1949, a major problem erupted for United States defense policy--the first Soviet nuclear detonation occurred. With this occurrence the United States' monopoly came to an end. New thinking was required as a completely different spectrum of problems now faced U. S. planners. In this seemingly cool period of relative detente how the United States reacted might well shape the arms race for generations to come.

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[40] Ibid., p. 241.

*For the 1950 budget President Truman placed a $14.2 billion ceiling on military spending, cutting the Air Force from the Congressional authorization of 70 groups down to 48 groups. Forrestal called for the authorization of three SAC bombardment groups over the 21 they already had. This he felt was needed since the President emasculated the conventional forces, causing almost total reliance on the nuclear deterrent capability of SAC. (See Millis, op. cit., p. 538.)

III. RETRENCHMENT AND EXPANSION 1949-1953

A. UNITED STATES' REACTION TO THE END OF THE NUCLEAR MONOPOLY

The Soviet nuclear detonation in August 1949 came sooner than most officials in the United States had anticipated. The major question at hand for the Truman Administration was how to handle this unexpected, policy shaping event. At the unanimous urging of the Atomic Energy Commission, President Truman announced on September 23 that the Soviet Union had detonated a nuclear device. This announcement was made after full consideration of all of the consequences and reminded the American people that the nuclear monopoly had always been only a temporary thing.[41]

President Truman had foreseen two basic problems in announcing the Soviet success. First, there was a fear expressed in the Administration that disclosure of the successful Soviet nuclear blast would cause a sense of panic in the Western world, a situation which ultimately failed to

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[41] The AEC believed the President should make the announcement as soon as it had been established with certainty that a Soviet nuclear blast had occurred. They believed that the information about the detonation was known by too many people (some 300 by September 19, 1949), and a security leak was certain to preempt a presidential announcement if it were not made soon. At the same time the State Department was urging the President to hold off such an announcement lest it further worsen the economic situation in Europe given that Great Britain had just devalued the pound. (See Hewlett and Duncan, op. cit., pp. 366-368, and Lilienthal, David E., The Atomic Energy Years 1945-1950, Harper and Row, New York, 1964, p. 570.)

materialize.[42] Secondly, the President believed that any United States response, even the announcement of the blast which would disclose the fact that the United States had been monitoring Soviet activities, might shatter what he saw as a very tenuous detente.*

At the same time policy makers were faced with a different problem, the end to the long-enjoyed United States nuclear monopoly. The thought of two nuclear powers, the United States and the Soviet Union, facing each other, each force deterring the nuclear might of the other, with the Soviets possessing a staggering conventional force advantage, became a very real concern for the first time.

This problem had been exacerbated when, in March 1949, Louis Johnson, the military critic and infamous budget

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[42] In a conversation with D. Lilienthal, Chairman of the AEC, on September 21, President Truman expressed his fears that the announcement of the "Vermont Affair" (the code word which signified that the Russians had detonated an atomic device) would bring things too near panic. (See Lilianthal, loc. cit., p. and Hewlett and Duncan, op. cit., p. 366-367.)

*The Soviet advance on Western Europe had been halted by 1949. Any further probes by the Communists were to be met with threats of war. The Berlin blockade had failed to prevent the integration of an independent West Germany into the Western camp. Yugoslavia had bolted from the Soviet bloc and with it went the Communist aspirations in Greece. Communist labor upheavals in France and Italy had been put down. In the face of the American nuclear threat the USSR simply was not powerful enough to change the situation, and Stalin was forced to accept the status quo in Europe. President Truman is reported to have seen this quiescent period as one of real detente characterized by a change in Soviet attitudes. He later attributed this to their finally achieving a nuclear capability of their own and with it a lower level of fear of the U. S. In reality it appears to have been a period of stalemate, at least in Europe, and maintained only so long as the power structure could hold the advisories in check. (See Rosser, op. cit., p. 262.)

cutting Secretary of Defense, was appointed by President Truman. From the beginning Johnson drastically cut military expenditures, cutting out the fat, the muscle, and even some of the bone.* Even given the startling new development of a Soviet nuclear blast, the austerity program was to continue throughout the early part of 1950.

B. EFFECTS OF THE KOREAN WAR

In response to the Soviet nuclear detonation, defense planners, in March 1950, released a master plan for United

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*In reality Louis Johnson was probably merely an avid executioner of Administration policies. He is frequently credited with the development of "the remainder policy" (where military budget is determined by what remains in the budget after domestic considerations) when in actuality the policy was probably developed by James Webb, former Budget Director, and was certainly in effect when Johnson came into office. Nevertheless, he quickly gained the reputation of being far more concerned with meeting budgetary ceilings than national security needs. (See Hammond, P.Y., "NSC-68: Prologue to Rearmament," Strategy, Policy and Defense Budgets, Schilling, W.R., Hammond, P. Y., and Snyder, G. H., Columbia University Press, J.Y., 1962, pp. 293, 328; and Millis, op. cit. p. 429-431.

States military efforts known as NSC-68*. This plan had received only vocal support, although fiscal requirements were being examined, when the Democratic People's Republic of Korea (North Korea) attacked across the 38th parallel on June 25, 1950. This attack found the United States ill-prepared to fight a conventional war, even on a limited scale.

In August 1945, when the Soviet Union attacked Japan, agreements still had not been made for the occupation of Korea. In an effort to keep Soviet troops from overrunning the entire peninsula, the United States had secured Soviet agreement to a temporary division of the country along the 38th parallel. By 1950 North Korea was a Soviet satellite, and the North Korean Army had undergone an accelerated build-up under Russian tutelage.

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*This report concluded that the Soviet Union had no grand strategy of its own but did have three objectives: 1. to preserve their internal power position, 2. to consolidate satellite control, and 3. to weaken any opposing powers and aspire to world hegemony. Furthermore, it predicted a "year of maximum threat," 1954, at which time Soviet economic recovery combined with earlier Western neglect of arms expenditures would allow them to launch a devastating nuclear attack by bombers on the U.S. To counter this it was deemed essential for the U.S. to provide protection for its bomber force, construct a system to warn of a pending attack, and provide means of defeating an air attack without being forced to resort to nuclear retaliation. Additionally, it said SAC should be strengthened in size and survivability. It further emphasized the inadequate force levels, shortcomings in the Western alliance system, and economic conditions in Europe. Recommendations were then made to increase levels of conventional forces to firm up the military balance--a program calling for substantial build-ups of Western ground forces. (For more detail see Hammond, op. cit., pp. 304-307, 320, 348, 357 and Adams, B.D., Ballistic Missile Defense, America Elsevier Publishing Co.Inc., New York, 1971, p. 10.)

There is little question today that the Soviets planned and directed the invasion of South Korea. The invasion, to many in the West, was a signal of a period of renewed aggression in Soviet policy.[43] At that time it might well have been as much a misreading of United States' intentions and resolve coupled with a simple attempt to capitalize on a perceived opportunity as any real change in Soviet policy.

By mid-1948 the United States had reduced occupation forces in Korea to a minimum, with the last of them being withdrawn from South Korea in 1949.* First General MacArthur and then, in January 1950, Secretary of State Dean Achison defined the American "defense perimeter" in Asia as running through the Phillippines, Okinawa, Japan, and the Aleutians with no mention of Korea.

This came at a time when the Soviet Union feared that the pro-American Japanese government might be rearmed. In the absence of a United States commitment, a swift and sure victory in Korea might well convince Japan to remain out of the Western sphere or at least on the fence.

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[43]Rosser, op. cit., p. 270-271.

*As early as March 1948 there were so few troops in Korea that it was not economically sound to attempt to continue such support. In 1949 the United States and the Soviet Union mutually withdrew all remaining combat troops, leaving behind only cadres to assist in the training of local military units. (See Millis, op. cit., p. 436, and Phillips, op. cit., p. 293.)

The completely unexpected reaction by the United Nations and the United States must have come as a shock to the Soviets. They were not to enjoy a swift and easy victory, they had managed to end the apparent political and military stalemate of the past year and they had awakened and alarmed the American giant--launching the United States into a massive rearmament program.

Conventional forces were now indeed augmented. The Air Force gained a new impetus with the major reliance still placed upon the deterrent capability of SAC, and the Navy was also expanded. The military budget of $14.2 billion in fiscal year 1951 now leaped to $48.2 billion, more than a three fold increase.[44] Before the year's end the Air Force was expanded to 68 groups, the Navy to 1028 ships, and the Army to 16 divisions.[45]

Much of the additional funds went into expanding SAC. Fears that Soviet aggression might further manifest itself in Europe were responsible for conventional force build-up as

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[44]President Truman had originally asked for $13.5 billion for defense, but Forrestal was able to get this raised to $14.2 billion. Once the Korean conflict erupted the military was able to push through a series of supplementary appropriation bills raising the final military budget to a new high of $48.2 billion. (See Hammond, op. cit., p. 351.)

[45]The increase reflected in the 1951 budget growth was substantial. In mid-1950 the military had ten understrength divisions, 48 Air Force groups, 671 ships and two very under strength Marine divisions. (See Huntington, op. cit., p. 59.)

well as a political push for the rearmament of West Germany to strengthen an emerging NATO.

With Communist China's entry into the Korean conflict the "year of maximum threat," predicted in NSC-68, was moved forward to 1952.[46] Military goals of 1161 ships, 18 divisions and twelve regimental combat teams, two and one-third Marine divisions, 95 Air Force wings, and 3.6 million men in uniform were now set for July 1, 1952.*

C. STRATEGIC AIR COMMAND EXPANSION

The year 1949 had already shown itself to be one of further expansion for SAC. Prior to the detection of the Soviet nuclear detonation, SAC had ordered an additional 75 B-36's to the previously ordered 95. Unable to get additional Congressional appropriations to buy the 75 aircraft, the Air Force utilized funds obtained by cancelling some existing contracts. Immediately following the Soviet blast the Air Force was given authorization to purchase another 155 of the

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46. "Responding to the deteriorating international situation and the domestic clamor for all-out mobilization, the Administration rushed the build-up of active military forces. Under the new plan the year of maximum danger was moved forward from 1954, the time suggested in NSC-68, to 1952." (For more details see Huntington, op. cit., p. 57.)

*By the target date of July 1, 1952, the military actually had surpassed most of the goals, and had 1130 ships, 20 divisions with an additional 18 regimental combat teams, three Marine divisions, 95 Air Force wings and 3.636 million men in uniform. (Ibid., pp. 60-61.)

intercontinental bombers.[47] At the same time SAC continued to take delivery of the B-50 reaching its maximum of five wings of this type in 1952.[48] Development of both the B-47 and B-52 continued at a quickened pace. SAC received its first B-47 in 1951, the same year in which the B-52 made its maiden flight.*

D. SOVIET SEARCH FOR AN INTERCONTINENTAL BOMBER

In the same field Soviet technology had not yet been up to the task of developing an intercontinental bomber of its own. Once the Soviets had entered the nuclear race and had their first weapons, the problem of delivery vehicles became acute. However it was not before 1953 that their first truly intercontinental bomber was to fly.[49]

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[47] See Schilling, W. R., "The Politics of National Defense: Fiscal 1950," Strategy, Politics and Defense Budgets, pp. 75n-76n and Jones, op. cit., pp. 124-127.

[48] Wagner, R., The North American Sabre, Doubleday and Co. Inc., Garden City, New York, 1963, p. 92.

* Even though neither the B-47 nor the B-52 were operational before the Korean conflict had abated, it is doubtful that either would have been committed to combat had they been available in great numbers. As it was a maximum of 5 wings of B-29's were committed, and even though the B-50 was available in quantity it was held back for fear of compromising the aircraft and its advanced equipment. (See Futrell, op. cit., pp. 45, 182.)

[49] Not until 1955 were the Soviets to achieve their goal of a long-range intercontinental bomber force. By that date they had aircraft capable of two-way missions against the U.S.--a capability of the highest priority once they had neclear weapons. (See Lee, The Soviet Air and Rocket Forces, pp. 94-95.)

Despite the strong desire to have a creditable long-range bomber force, as was evidenced by the earlier construction of 1000 TU-4's, Soviet jet-engine technology had proven itself unable to meet the challenge. Airframe design had continued throughout the period, but in the absence of a powerplant capable of producing over 10,000 pounds of thrust heavy jet aircraft could be little more than a designers dream.[50] Nevertheless, in the three years of the Korean War, Soviet strategic attack hardware requirements appear to have continued to expand. Jet technology finally reached a point where in 1951, assuming a lead time of about four and one half years, the Soviets made the decision to produce the TU-95

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[50]Jet engine development seems to have accelerated in 1948, but the big engines necessary for the intercontinental bombers were still several years off. To engine the Ilyushin and Tuplov heavy jet bombers which the Soviets were planning to make at the outbreak of the Korean War called for engines of 10,000-15,000 pounds static thrust, and the Soviet technology and industry were simply incapable of meeting this requirement at that time. Therefore, until at least late 1952 or early 1953 the Soviet Air Force very likely accumulated at least a limited stock-pile of atomic weapons for a long-range bomber force not yet in existence. (See Lee, Soviet Air and Rocket Forces, pp. 193-194.)

Bear, the MI-4 Bison, and the TU-16 Badger. These all became operational after the Korean conflict had ended.*

E. AIR DEFENSE IN THE UNITED STATES

Continental air defense gained real importance in the United States for the first time. A follow-on study to NSC-68 was conducted in 1951, "Project Charles," which outlined in great detail the problems of an active air

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*All three of these aircraft were in some stage of production in 1953. The prototype of the MI-4 Bison is known to have been rolled out in July of that year, and the first flight was the following November. It was first seen publically in a ten plane flyover in the 1955 May Day Parade, and twelve were seen in formation later in July. The MI-4 was not operational until 1956. Less information is available on the TU-16 Badger and the TU-95 Bear, but they were known to be in production in 1953. The prototype of the TU-16 was first seen in 1952. The first public display was a squadron sized flyover in the 1954 May Day Parade, but it was not yet operational. The TU-95 prototype was out by 1955 and possibly sooner because a seven plane formation was seen in the Air Force Day Parade in July 1955. (See Stone, Jeremy, Containing the Arms Race, MIT Press, Cambridge, Mass., 1966, pp. 92, 128, Aviation Week, May 10, 1954, vol. 60, no. 19, p. 14, Aviation Week, May 23, 1955, vol. 62, no. 21, pp. 13-14, Aviation Week, July 11, 1955, vol. 63, no. 2, p. 13 and Green, William, The World Guide to Combat Planes Vol. 2, Doubleday and Co., Inc., Garden City, New York, 1967, pp. 63-69.)

defense system.* The possibilities of a workable system gained further credence with the Korean experience. The efficiency of the early warning network employed by the Communists over North Korea coupled with jet interceptors was able to force the halt of daylight B-29 raids on Communist targets.

As late as 1950 air defense was still conceived largely in World War II terms: an early warning system to alert both fighter aircraft and anti-aircraft artillery surrounding major targets. The air battle would be conducted visually by fighter aircraft, along tactics selected by those on the scene. Speed of reaction to a raid warning, range of the flight, and air battle tactics were basically the same as those which had governed the epic Battle of Britain ten years earlier.[51]

The Korean War now brought about a fresh review of air defense. It soon became apparent that no single improvement in any one element would measureably facilitate the ability to destroy an attacking enemy force. New thinking emerged as it

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*The Charles Report was part of the aftermath of NSC-68 and stated that the United States was vulnerable to a Soviet air attack. This was followed by the "Summer Study Group" in 1952, and recommended the building of the DEW Line. It re-emphasized the inability of the country to repell an enemy air attack and called for a crash program to rectify the shortcomings, most importantly, in the early warning system. (See Goldberg, op. cit., p. 135 and Quester, op. cit., p. 74.)

[51]Conant, Melvin, The Long Polar Watch, Harper and Brothers, New York, 1962, p. 34.

became more obvious that with each passing year less and less alert time would be available with all the major powers entering the jet age and making major strides forward in aircraft technology. The additional problem created by a nuclear armed attacking force meant that the defenders could no longer be satisfied with the World War II target of ten percent attrition of attacking aircraft. The Air Force now believed that they would have to stop at least 70 percent, and perhaps as much as 95 percent, of the attacking bombers to be effective--a feat they clearly were not up to.[52]

Several studies grew out of the need for some meaningful change, such as Project Charles previously mentioned, all pointing to the need for an extensive long range warning network covering the continental approaches to the United States.[53] Eventually, studies in both the United States and Canada led

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[52]In World War II, it was generally assumed that an air attack could not be pressed if the air defense inflicted more than ten percent attrition on the enemy bombers. This philosophy, of course, assumes a protracted air war which extends over some long period of time. In a nuclear exchange a bomber, in all probability, would make no more than one strike and certainly no more than two. Air defense would have to inflict far heavier damage on the attacker--between 70 and 95 percent--to achieve the same results. (See Conant, op. cit., p. 38 and Huntington, op. cit., p. 327.)

[53]In a study conducted in 1949-1950 it was concluded that "continental air defense was inadequate and would not be substantially improved by the Permanent System then being installed." It is interesting to note that 1949, the year the study began, was the same year that the Air Force convinced Congress that the $86 million network was essential to national security. Even after it was determined to be inadequate and offered little improvement, construction continued, and it became operational in 1953. (See Goldberg, op. cit., pp. 130, 134.)

to the construction of a network of three separate warning lines: the Pine Tree Line, the Mid-Canada Line, and the Distant Early Warning Line (DEW Line). None of these ambitious undertakings were completed during the period 1949-1953, but the studies leading to the decisions to undertake such construction were initiated in this period.*

In order to acquire some air defense capability as soon as possible the Air Defense Command initially utilized reservists recalled to active service. They were used to man the equipment being installed in the interim radar network, "Lashup," as it moved toward the mid-1950 completion date. Air National Guard units were pressed into active service to provide the needed fighter protection, and actual interception of unknown aircraft was authorized by the President for the first time.[54]

On September 1, 1949 the Air Defense Command had been abolished in favor of an Eastern Air Defense Force and a Western Air Defense Force under the Continental Air Command (CONAC).

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*In 1951 the United States secured an agreement with Canada which allowed the building of Pine Tree in southern Canada. Pine Tree was the first network to provide both early warning and ground control intercept capability. It consisted of about 30 separate radar stations and stretched across Canada and the northern U.S. The Mid-Canada Line and DEW Line agreements were not reached until 1954 after long negotiations. The Mid-Canada Line lies on the 55th parallel and was to be constructed by the Canadians. The DEW Line had received sanction by the President in his approval of a 1952 NSC policy statement which called for its construction. It was to be built on the 69th parallel by the U.S. Even before the formal agreement had been reached the U.S. was testing equipment in Canada for the effects of cold weather operations. (Ibid., pp. 133-135.)

[54]Ibid., p. 130.

This proved to be an unsatisfactory arrangement and on January 1, 1951, ADC once again became an independent command.[55]

To round out the picture the Air Force sought to improve its all-weather intercept capabilities. In 1950 the Air Defense Command acquired improved versions of the F-94, and by 1951 was receiving its first F-89's and later the F-86D's. In 1951 Convair was awarded the contract for development of the "ultimate" interceptor, the F-106, but it soon became apparent that this aircraft would not be available before 1956. In the interim something else was needed. The Air Force again turned to Convair for the F-102, an "off-the-shelf" predecessor of the F-106. It was to be operational by 1954. Ultimately the F-102 did not gain an operational status until 1956, and the F-106 was not in service until the end of the decade.

Ironic as it might seem the biggest opponent of air defense was the user itself, the Air Force. There was general agreement on the need for the expanded system, but at what price? If the extensive air defense program which had been proposed was to soak up funding which the offensive-minded Air Force hierarchy had planned for offensive weapons systems, such as B-52 development, then the program was unacceptable. The Air Force referred here to a "Maginot Line psychology" in an effort to forestall the drain of appropriations from their offensive

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[55] Ibid., p. 130.

budget.[56] As the possibility of the construction of the hydrogen bomb became more a reality the perceived need for air defense grew. The offense proponents lost as development of an air defense system continued. This was not the devastating loss they had expected, however, because the now-higher defense bueget allowed for such development without seriously penalizing the offensive weapons system.

Another major component in the air defense system came into being on July 1, 1950 with the establishment of the Army Antiaircraft Command (ARAACOM) to control antiaircraft artillery. Although this was an Army organization, all the antiaircraft units were placed under the operational control of the Air Defense Command. These units were initially equipped with artillery batteries but were to be rapidly expanded, in 1954, to include the Nike antiaircraft missiles as they became operational.[57]

The Korean War had focused attention on the need for air defense, yet, at the same time, it served to weaken what air defenses that existed in both the United States and the Soviet Union. The need for fighters caused both sides to commit much

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[56]The Air Force saw expenditures for this new air defense system as draining off and slowing down offensive force growth. The official higher echelon Air Force position was to push the offensive weapons systems implying that any air defense system might well be as vulnerable as was the Maginot Line. (See Quester, op. cit., p. 82.)

[57]Goldberg, op. cit., pp. 132-133, Adams, op. cit., p. 18, and Aviation Week, May 10, 1954, vol. 60, no. 19, p. 18.

of the inventory of fighter aircraft to the conflict. The drawing off of these fighter-interceptors undoubtedly weakened the air defenses of both adversaries and made any potential bomber attack more likely to penetrate unmolested.[58] The Soviets having traditionally been more defense-minded had more defensive aircraft. The re-deployment of thousands of fighters to the Korean theater undoubtedly had less effect on defense of the Soviet Union than a similar move would have on an already strained and meager system of air defense in the United States. The Soviets, nevertheless, still faced a far more creditable bomber threat than did the United States.

F. SOVIET AIR DEFENSE DEVELOPMENT AND EXPANSION

The speed at which the Russians had built up their defensive network of radar installations and fighter-interceptor forces in the first five years after World War II is a clear indication of the importance of the threat they credited to the United States strategic force. By liberal borrowing from captured German and purchased British jet engine technology, the Soviets were able to produce large numbers of good day fighters in the early 1950's.

One area in which they sorely lagged behind the West, despite the capture of operable equipment in World War II, was

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[58] By mid-1952 the Communists were maintaining about 7000 aircraft in the Korean theater. Given that U.S. Air Force pilots alone destroyed over 900 enemy aircraft in air-to-air combat, the Soviets ultimately were forced to provide some 8000 aircraft to the Communist forces. (See Quester, op. cit., p. 78 and Futrell, R.F., et al, The United States Air Force in Korea 1950-1953, Duell, Sloan and Pierce, New York, 1961, p. 724.)

in airborne radar, a necessity for all-weather interception operations. However, they had considerably more success in duplicating the German early warning and ground control interception radars.

By the outbreak of the Korean War the Soviets had constructed a very thin early warning network in the Far East along the coast lines of the Maritime Provinces near Vladivostock and further north in the Magadan region opposite Alaska.[59]

It was the Korean War which proved to be the first real, largescale test of Soviet made and operated air defense equipment. The Soviets supplied the North Koreans and Chinese with vast quantities of equipment in the form of early warning radars, and interceptors. The effectiveness of even this rudimentary system was demonstrated by the United States Air Force's decision that, because of heavy losses to MIG-15 interceptors, all B-29 raids would have to be at night.[60]

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[59] "By 1946 the first radar early warning units were being trained and set up to give long-range warning of the approach of unfriendly planes along the Baltic coasts or over the frontiers of central and eastern Europe." By 1950 this line was expanded to the Far East, but it was, at best, a very thin system, one which would take years to expand, equip, and staff with personnel trained to the degree necessary to meet the threat of the growing United States nuclear strike force. (See Lee, Soviet Air and Rocket Forces, p. 121.)

[60] On October 28, 1951 the decision to use the B-29 only on night raids was made because there simply were not enough F-86's available to provide adequate protection for the vulnerable bombers. (For more detail see Futrell, op. cit., p. 385.)

The Russian-built radar net was obviously effective and gave the Communist defenders adequate and consistant warning of the approach of United Nations aircraft. Only the absence of an all-weather fighter prevented them from severely hurting the attacking bomber forces. Even in daylight hours against UN fighter sorties, they held a considerable edge because the early warning network allowed them to choose the time and place of the fight and gave the defender the advantage of knowing that the attacker was enroute. Only the superior skills and training of the United States' pilots accounted for the eight to one kill ratio over the Communist pilots, not superior equipment.*

This wartime experience had pointed up the serious shortcomings of inadequate airborne and ground control intercept radars. At best, the most efficient radar to be employed by the Soviets was the facility at Antung, Peoples Republic of China. By late 1952 they appeared to have made a breakthrough in ground control intercept radar, and Antung received the first of this new equipment, as good as anything produced in the West. This new facility could place an interceptor within two to five miles of a target, but the actual intercept

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*This eight to one kill ratio is somewhat misleading in that a total of 121 U.S. planes lost in air-to-air combat to Communist forces included such aircraft as the prop driven North American P-51 of World War II vintage. If we look only at the F-86, which was the only fighter in the theater flown by U.S. pilots which was comparable to the MIG-15, the ratio was better than ten to one with the F-86's downing 792 MIG's while loosing only 78 Sabres. (See Wagner, op. cit., p. 78.)

still had to be made visually. The network had as many as 25 early warning units and an additional eleven ground control intercept units.[61] Early warning coverage extended south of the 38th parallel.[62]

Without the assistance of an airborne interception radar the Communist were forced to look to alternative methods. Night interceptions were aided by the use of radar controlled search lights which proved themselves to be very effective against the slow flying night bombers.[63]

Realizing that such crude methods were far less than optimal, the Soviets continued research and development in the area of airborne radar, meeting with only limited success.

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[61]The latest model of Soviet radar appears to have gone into Antung (Communist China) in late 1952. Prior to that time the Antung facility, as elsewhere, appears to have been made-up of obsolete United States made equipment of World War II vintage and poor quality Soviet made equipment. (See Futrell, op. cit., p. 473.)

[62]Communist radar coverage was most effective down the West coast of Korea with ground control intercept out as far as 90 miles although accurate interception seemed to not extend beyond 70 miles from Antung. (Ibid.)

[63]Communist forces were provided a number of radar controlled search lights which once locked on a target would facilitate target spotting by adjacent manually directed lights. Fighter interceptions were then frequently made with the slow flying bombers making easy targets for the jets. Until active jamming was introduced, which successfully thwarted the search light efforts, the bomber forces sustained heavy losses, even at night. (Ibid., pp. 473,573.)

As early as 1952 they flew the YAK-25, their first all-weather interceptor, but none of these aircraft saw service in Korea.[64]

In that same year high-ranking Soviet Air Force officers and leading Soviet aircraft designers held a conference to study the combat deficiencies of the MIG-15. From that study group emerged an improved version of the MIG-17. It found its way into service in 1954.[65]

Having fallen privy to German developed weapons, the Soviets were working on a surface to air missile. Like the United States, their early efforts in perfecting such a weapon met with only limited success, and none were operational in the period which encompassed the Korean conflict.

G. HYDROGEN BOMB DEVELOPMENT: THE UNITED STATES' DECISION

One other event of the 1949-1953 period which was to be the single most important policy and strategy shaping decision of the postwar period has yet to be discussed--the hydrogen bomb decision.

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[64]Until the production of the YAK-25 in 1952, the Soviet Union had no meaningful all-weather intercept capability. The effectiveness of the YAK-25 was doubtful even in later years because of its poor quality airborne radar. None were reported seen in China or Korea. (See Lee, Soviet Air and Rocket Forces, p. 141.)

[65]Although the MIG-17 closely resembled the MIG-15 in appearance it was a completely new design and far superior to its predecessor in performance. Work on the MIG-17 quickly led to the development of the MIG-19, the prototype of which first appeared in 1953. This twin engined fighter was later to prove itself to be a superior aircraft and was the backbone of the Soviet fighter force for many years. (Ibid., pp. 140-141.)

Shortly after the United States' monopoly of nuclear technology ended, a means of restoring the pre-1949 balance was discussed in Washington. The obvious means of restoring the favorable position enjoyed by the United States was for the West to proceed with the next generation of bomb development--the "Super" or as it was later known, the H-bomb. Admiral Strauss, then a member of the AEC, first suggested the "Super" on September 30, 1949 as a reaction to the Soviet nuclear blast. His suggestion was forwarded to the President.* On October 5 the AEC Advisory Committee met to discuss the feasibility of such a weapon. This group ultimately rejected the idea for "technological, political, and moral" reasons.[66] Nevertheless, the Joint Armed Services Committee and the Joint Chiefs of Staff were determined.

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*Oppenheimer's research group, in the summer of 1942, had discovered the theoretical possibilities of developing a hydrogen device based on the fusion of very light elements. Little work was done thereafter because the extreme temperatures and pressures suggested the need for a fission device to trigger the reaction, and no such devices were available for experimental uses. Not until the doldrums of the post war years did Teller and others begin to work to change the theoretical into real-world operations. At the time of the Soviet nuclear blast the President was not aware of the existence of such a theory. Admiral Strauss was able to convey this information to the President through Admiral Souers, Executive Secretary of the National Security Council, bypassing Lilienthal who was against such a weapon from the start. (See Hewlett and Duncan op. cit., pp. 59, 374, and "The Hidden Struggle for the H-Bomb," Fortune, May 1953, vol. 47, no. 5, p. 109.)

[66]For a more complete reading on the exact reasoning for the Committee's recommendation that the President reject development or even further studies into the feasibility of such development see York, Herbert F., Race to Oblivion, Simon and Schuster, New York, 1970, pp. 36-37.

to proceed with a feasibility study and to have such a weapon if at all possible. With the urging of such noted scientists as Edward Teller and E. O. Lawrence, the President made the decision to go ahead with the feasibility study phase. This later led to the decision to produce the device which was exploded in 1952.** The President's decision to proceed with the project was announced to the press on January 31, 1950 after a leak had indicated the project was to be undertaken.[67]

As progress continued in thermonuclear development, with devices being set off in the 1951 Eniwetok tests which were considered necessary in the development of the Super,[68] opponents of such a destructive device began to urge the President to adopt a "no-first-test." Under this plan the United States would vow not to test a fusion weapon unless the Soviets did. This proposal was rejected by President Truman, and plans for the first test to be comducted in 1952 continued.[69]

**One of the deciding factors to go ahead with the development of the "Super" seems to have been the arrest of Klaus Fuch in January 1950 in Britain on charges of spying for the Soviets. Teller remembered that Fuch had been present at a Los Alamos seminar in 1945 and "may have gleaned the correct solution." (See "The Hidden Struggle for the H-Bomb," loc. cit.)

[67]The source of the leak was Senator Edwin C. Johnson. On a locally broadcast television program in New York, he casually mentioned the "Super" while castigating scientists for security leaks. (See Hewlett and Duncan, op. cit., p. 394, 406.)

[68]Four tests, the Greenhouse series, in April and May 1951 demonstrated thermonuclear principles and provided essential data necessary to proceed with the "Super" development. (See Kramish, op. cit., pp. 546, 672.)

[69]See Quester, op. cit., p. 82.

On November 1, 1952, three days before the presidential elections, the United States successfully detonated the world's first thermonuclear device. The announcement of the success was delayed until 1954.[70]

Much of the leadership in the United States had been unable to see any clear guarantee of victory or even deterrence in being the sole possessor of the atomic bomb, but the promised thousandfold increase in destructive power of a hydrogen weapon opened new horizons. A monopoly of hydrogen weapons would offer political as well as military advantages not previously enjoyed. In any case it clearly made obsolete the strategic bombing concepts which had grown out of World War II and would surely quieten even the most avid opponent of strategic bombing who based his criticism on the suspected ineffectual use of atomic weapons.[71]

It is clear that the decision on the part of the United States to proceed with first the feasibility studies and then the actual construction of a thermonuclear device was in direct reaction to the Soviets breaking of the nuclear monopoly. After all, United States scientists had completed the

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[70]The United States did not officially report the November 1, 1952 thermonuclear test until April 7, 1954. World had long since leaked out as the outgoing mail was not censored from Joint Task Force 162 located only 30 miles from the blast. Another source of leaks was evident when the AEC's director of information received a telephone call from a Time reporter requesting information "about the H-bomb that had just gone off," within minutes of the blast. (See Voss, Earl H., Nuclear Ambush, Henry Regnery Co., Chicago, 1963, p. 34, and Hewlett and Duncan, op. cit., p. 592.)

[71]See Quester, op. cit., p. 69.

theoretical research on such a device as early as 1942, but work was never allowed to proceed significantly beyond this point. The responsive decision which followed the 1949 nuclear blast, in retrospect, may well have been very timely indeed. Apparently from the time they first became convinced that thermonuclear weapons were feasible, the Soviet Union appears to have decided to bypass atomic bomb refinement and press directly for a thermonuclear device.[72] Existing evidence indicates that their atomic detonation probably served only as a necessary prerequisite for hydrogen bomb production. This is supported by the small number of Soviet nuclear tests which proceeded the detonation of a thermonuclear device on August 12, 1953. They had, of course, detonated their first atomic device on August 29, 1949, but none was detonated in 1950 and only two blasts occurred in 1951. The next test was that of a thermonuclear device in the following year.[73]

On August 8, 1953 Malenkov boasted that "The USA has long since lost the monopoly in the matter of the production of

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[72] "After the war, when the feasibility of a hydrogen bomb was being debated, it was the overwhelming, and in this case, justified fear that the Russians were already at work in the area that compelled us to embark on a development program even before we knew precisely how to go about it." The relatively close spacing of the Soviet and United States hydrogen detonations and the development of a deliverable bomb, given that the first Soviet thermonuclear device was more sophisticated and advanced than the device of the United States indicates that the Russian scientists started at least as soon as did the Americans and probably sooner in hydrogen bomb development. (See Ruina, J.P., "The Nuclear Arms Race: Diagnosis and Treatment," Bulletin of the Atomic Scientists, Oct. 1968, vol. 24, no. 8, p. 20, York, op. cit., p. 40, Quester, op. cit., p. 92.)

[73] Voss, op. cit., pp. xii-xiii.

atomic bombs . . . The government deems it necessary to report to the Supreme Soviet that the U. S. has no monopoly in the production of the hydrogen bomb either."[74] This announcement was met with great skepticism in the West until four days later the device was detonated.*

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[74] Kramish, op. cit., p. 124.

*The Soviet device appears to have been more plausibly deliverable than that of the United States. It had used the "dry" concept of lithium hydride, a necessary requirement for a deliverable weapon. This allowed them to get away from the massive refrigeration required of the first American thermonuclear device. (See Quester, op. cit., p. 92, and Chapman, John L., Atlas: The Story of a Missile, Harper and Brothers, New York, 1960, p. 72.)

IV. TRANSITION TOWARD MUTUAL DESTRUCTION CAPABILITY: 1953-1957

A. THE TRANSITION

In the period 1953-1957 the relationship between the United States and the Soviet Union underwent a critical transition. Prior to 1950 their on-again, off-again relationship had been characterized by each of the two powers probing the other. The Korean War brought about a re-evaluation of the threats posed by the adversaries and the beginning of the reaction decisions which would launch the two super powers into what has become commonly known as the arms race. The threat of mutual destruction was to gain real meaning as thermonuclear weapons came into existence. The year 1953 saw the beginning of a period characterized by intense competition where strategies were revised and resources reallocated to meet the challenges posed in the thermonuclear age.

B. THE NEW ADMINISTRATION OF THE SOVIET UNION

The Soviets had suddenly found themselves under new administration. On March 5, 1953, Josef Stalin died and this, at least temporarily, threw the governmental apparatus into disarray as the Soviet hierarchy maneuvered for position in the new government. They were now to see another ruler rise

to power in the Kremlin--Khrushchev.* The new leader was faced with a party unwilling to accept another dictator. Thus he consolidated his position by his dynamic leadership in manipulating party majorities.[75]

Khrushchev was then able to shift the Soviet grand strategy, but he did not change the basic objectives of Soviet foreign policy.[76] The West, in particular the United States, was still the main enemy, but direct confrontation had not rendered the desired gains. Khrushchev had idealistically hoped in this period that the Soviet Union could isolate the West by building a vast alliance system in

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*Nikita Khrushchev assumed the post of First Secretary of the Communist party on March 14, 1953. Georgii Malenkov held the position of Premier. In a power struggle which ensued Khrushchev eventually won and Malenkov resigned on Feb. 9, 1955. The struggle for leadership evolved around competing philosophies. Malenkov believed the economy should be oriented more toward consumer goods. Khrushchev believed it should go more toward military hardware. The later view prevailed, and Marshal Bulganin replaced Malenkov. From that time on, even though he lacked any official governmental position, at that time, Khrushchev grew in power and became the primary governmental functionary. (See Rosser, op. cit., p. 281, Mackintosh, op. cit., pp. 88-89, and Ulam A.B., Expansion and Coexistance, Prager Publishers, New York, 1971, p. 540.)

[75]In 1957 Khrushchev was able to stand off a challenge from Malenkov, Molotov, and Kaganovich by getting backing from the secret police and army. His power position was solidified to a considerable degree after having successfully thwarted efforts to oust him. (See Rosser, op. cit., pp. 305-307.)

[76]The basic objectives of Soviet foreign policy did not change with Stalin's death although a different approach was sought. The primary requirement of that time was to relax tensions with the West. The next was to seek out a new approach for achieving Soviet goals. (Ibid., pp. 280-307.)

Asia, Africa, and Latin America. At the same time the Soviets moved to match the strategic might of their foe.[77]

The Korean War had significantly affected the Soviets. In particular, the response of the United States to the war served as a clear indicator that attempts at Soviet expansion were to be met with forcible containment.[78] The United States enjoyed a position of strategic superiority and seemed determined to retain this distinction. The Soviets, as the challengers, were obliged to take compensatory measures to match its strategically stronger competitor. Since the end of World War II, perceived challenges to the strategic superiority of the United States were met with a strong response. This characteristic became amplified in the decade of the fifties and was the character of the interaction aspects of the strategic relationship between the United States and the Soviet Union in this period.

C. EISENHOWER'S NEW LOOK

The United States too came under a new administration--one which was to show a clear preference for fiscal economy.[79]

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[77] Ibid., pp. 290-297, 307.

[78] Wolfe and Ermarth, op. cit., p. 41.

[79] The new Republican Administration saw the development of thermonuclear weapons as the "absolute weapon." The superiority of the United States' strategic arsenal was seen as a way to cut back on military spending. By maintaining a destructive nuclear capability the country could relax its conventional force requirements. (See Quester, op. cit., p. 89.)

With the new administration the United States began to change its attitudes toward security. Following the Korean War a comprehensive review of the nation's strategic position was made, and alternative approaches to security were analyzed. In a redefinition of the problem, it was determined that the threat to the United States was a continuing threat which was two pronged--both military and economic.[80] This redefinition became the Eisenhower "New Look" and stressed a preference for fiscal economy over those military programs which were not concerned with the strategic capability of the country.

Where NSC-68 had attempted to provide for balanced military forces, the New Look was an attempt to provide a balance between a strong military and a strong economy. This was deemed necessary since both would have to remain viable over the long-haul. Too great a rate of expenditures for defense might produce inflation and economic ruin. The use of maximum threat target dates for greatest levels of effort was abandoned. The threat was perceived as being continuous, and expanding efforts to meet some imagined period of maximum threat would thus be economically damaging. Constant levels of defense efforts which would not shift with the changing world political situation were required. The death of Stalin and the termination of the Korean War has lessened the danger

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[80] Snyder, Glenn H., "The 'New Look' of 1953," in Strategy, Politics and Defense Budgets, Schilling, Warner R., Hammond, Paul Y., and Snyder, Glenn H., Columbia University Press, New York, 1962, p. 383.)

of all-out war. In an abandonment of the year of maximum threat, the future danger was not seen as being significantly greater than it was when the Eisenhower Administration came into office.[81]

By mid-1953 the dominant military fact was the overwhelming nuclear superiority of the United States, in terms of both number of weapons and delivery systems. The earlier expansion programs of the Atomic Energy Commission and the Strategic Air Command were now approaching fruition. NSC-68 had assumed that stability would be reached when the Soviets acquired a nuclear delivery system of their own and the West had built up its conventional forces. The New Look proposed that stability already existed and had for some time--where the West lacked one and the Soviets lacked the other. Such a declaration of faith would then allow the Eisenhower Administration to reduce expenditures for conventional forces, and the economy could relax from a state of permanent, partial mobilization. The technology of the nuclear age would thus provide the means for economy.[82] Against this background of proposed balance between the economy and security, the Soviet Union exploded a thermonuclear device on August 12, 1953.

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[81]Huntington, op. cit., pp. 65-68.

[82]Ibid., pp. 67, 74.

The implementation of the new look began in the spring of 1953. The Truman budget for fiscal year 1954 was reviewed for possible reduction by the new Administration, which had been voted in on a promise to reduce governmental spending.[83] The Truman budget had requested $41.2 billion for defense. President Eisenhower considered this excessive and eventually submitted a request for $35.8 billion.[84] This reduction was achieved by halting the expansion efforts of the Army and Navy and by trimming the support forces of all three services. The ultimate goal of 143 wings for the Air Force by 1956 remained, but the June 30, 1954 interim target was reduced from 120 wings to 114 wings. Production limitations would not have allowed for 120 wings, and the budgetary cuts only reflected this limitation.[85] The overall buildup rate of the Air Force was unchanged, and the President assured the nation that 60 cents of every defense dollar was being devoted to air power and air defense.[86]

In May 1953 a study was organized to examine possible alternatives to existing politico-military policy. Three

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[83]Snyder, "New Look," p. 393.

[84]This figure was further trimmed to $34.5 billion by the Congress, (Ibid., p. 396.)

[85]Snyder, "New Look," p. 397, and Bottome, Balance of Terror, p. 35.

[86]In addition to the Air Force's appropriations, over half of the Navy's budget was for naval aviation. (See New York Times, May 20, 1953, p. 24.)

different groups presented briefs advocating: 1. a continuation of the "containment policy," 2. drawing a sharp line and informing the Soviets that if crossed, they would be severely punished, 3. a policy of liberation, with vigorous programs to "roll back" the Communist sphere of influence.[87] The purpose of the groups was not to adopt any single position or develop a synthesis but to examine three quite different approaches and develop background material for further examination. The President received the reports in late July and forwarded them to the Policy Planning Board of the National Security Council (NSC) with instructions to formulate a basic policy paper. The NSC, after examining the three reports, opted for a policy of "containment" with some modifications. They felt the increased nuclear capability of the United States would be an important deterrent to Communist expansion and should be emphasized as should continental defense. It was further concluded that the Soviets had the capability to attack the United States, and therefore national security should take priority over all other policy objectives. The threat was interpreted as "total" (military and economic) and continuing, but it was concluded that there was little danger

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[87] A fourth position was considered briefly: giving the Soviet Union a deadline for negotiations, and threatening dire consequences for failure to reach an agreement. This was rejected as being too menacing. (See Snyder, "New Look," p. 409.)

of war in the immediate future.[88] This all came together to make up NSC-162.

The "basic decision" to implement the New Look was presented by the new Chairman of the Joint Chiefs of Staff, Admiral Radford, on October 13, 1953. Its premise was the "abandonment of the assumption that general war or large-scale limited war would be waged without recourse to nuclear weapons." It was adopted by the NSC and approved by the President as NSC-162/2 on October 30, 1953.[89] The first public statement on the new defense concept was made by Admiral Radford in December of that same year. It received further definition by Secretary of State Dulles in January, 1954 in his "Massive Retaliation" speech.[90] Given this new defense philosophy the United States entered an era where it was much more likely to be pushed into an arms race than before.

D. THE BOMBER GAP

With the increased reliance on nuclear deterrence by the United States, the safety of the delivery system became vitally important. Accounts began to circulate of huge new

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[88] Huntington, op. cit., p. 73.

[89] Ibid., p. 74.

[90] Perry, Robert L., "The Ballistic Missile Decisions," P-3686, Rand Corp., Santa Monica, 1967, p. 11.

Soviet turbo-prop bombers.[91] In the May Day Parade flyover in 1954, the appearance of a squadron-sized formation of TU-16 Badgers and a four engine MI-4 Bison (roughly the equivalent to the B-47 and B-52 respectively) caused quite a fibrilation of Western hearts. The message was retransmitted on May Day 1955, when Western observers were treated to an "aerial Ptomkin village" in the form of seven turbo-prop TU-95 Bears, twelve Bisons, and three plane formations of Badgers totaling fifty-four aircraft. There were also forty-eight supersonic MIG-19's and fifty all-weather YAK-25's.[92] The TU-16 threatened the United States overseas base structure, and the TU-95 and the MI-4 were believed capable of striking the continental United States on a round trip mission.

The Central Intelligence Agency, when asked for the maximum number of intercontinental bombers the Soviets could produce, gave a figure of 15-20 per month.[93] At this time the B-52 was just entering series production, and at a much

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[91]The aircraft observed were IL-38's, also called "type 31" and TU-200's, the latter being a six-engined turbo-prop. Sources as authoritative as Aviation Week's David A. Anderton were reporting as many as 400 of the two types being based in Siberia in early 1954. Actually these aircraft were underpowered and only a few of each were produced. (See Anderton, David A., "Pictures Reveal Red's New Sunday Punch," Aviation Week, February 15, 1954, vol. 60, no. 7, p. 12, Quester, op. cit., p. 128, Kilmarx, op. cit., p. 252.)

[92]Aviation Week, July 11, 1955, vol. 63, no. 2, p. 13.

[93]See Dulles, Allen, The Craft of Intelligence, Harper and Row, Publishers, Inc., New York, 1965, pp. 151-152, and Lee, Soviet Air and Rocket Forces, p. 110.

lower rate.[94] The TU-95 and MI-4 had been developed considerably faster than the United States had expected and gave the appearance of a crash program. If pursued at the maximum rate believed possible, the Soviets would have some 600 to 700 of these aircraft by 1959. This would be substantially greater in number than the 400 B-52's scheduled for production in the same time period. The result was the first of several "gap" phenomena in the United States. The "Bomber Gap" was the result of a willingness on the part of many "civilian and military leaders" to believe that the Soviets had the capability and desire to produce large numbers of long-range bombers.[95]

The fiscal-minded Republican administration was forced to disrupt its concept of level defense efforts. The procurement of B-47's had been stretched out and the B-52 program had been delayed. In 1954 SAC was dependent on overseas bases to put its B-29's, B-47's, and B-50's in range of the Soviet Union. The classic Rand study of overseas basing released in 1954 indicated their increasing vulnerability and recommended the use of forward basing only for post-strike refueling, if at all.[96] This required a larger tanker fleet,

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[94]Green, The World Guide to Combat Planes, Vol. 2, p. 34.

[95]See Bottome, The Balance of Terror, p. 35, Wolfe and Ermarth, op. cit., p. 48.

[96]See Wholstetter, A. J., et al, Selection and Use of Strategic Air Bases, R-266, Rand Corp., Santa Monica, 1954, pp. 335-336.

so orders for KC-97's were increased to nearly 900.[97] The truly optimum bomber would be an intercontinental jet bomber, so the B-52 production rate was stepped-up beginning in 1955 from 10 to 20 aircraft per month and the overall goal raised to 598 aircraft.[98] A new jet tanker was ordered, the first of some 400 KC-135's being delivered SAC in July, 1956.[99] Development of the SM-62 Snark, a 5000 mile, turbojet powered cruise missile was expedited, and the first operational unit was formed at the end of 1957.[100]

Two Navy strategic systems achieved initial operational capability during this period. Both were evolutionary. In 1954, the Regulus I bombardment cruise missile joined the fleet, and in 1956 the A3D-1, successor to the AJ series entered operating units. By 1957 the Regulus I was deployed on two submarines, ten aircraft carriers and four cruisers. The Regulus I and its planned successor, Regulus II, both competed for funds with the Polaris missile system. As a result they were sharply curtailed in 1957. Nevertheless, Regulus I missiles on five especially configured submarines remained on

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[97] Goldberg, op. cit., p. 61.

[98] Boeing began production of the B-52 at its Wichita plant in addition to its Seattle plant in 1955. (See Swanborough, F.G., Combat Aircraft of the World, Temple Press Books, London, 1962, pp. 15-16 and Wolfe and Ermarth, op. cit., p. 48.)

[99] Glines, Carroll V., The Modern United States Air Force, D. Van Nostrand, Co., Princeton, 1963, p. 61.

[100] Caiden, Martin, The Winged Armada, E. P. Dutton and Co., New York, 1964, pp. 44-45.

launching stations from 1959 to 1964. The A3D continued to serve as a strategic bomber on Navy carriers until the 1960's.[101]

E. MISSILE DEVELOPMENT IN THE UNITED STATES

At the end of World War II, several noted scientists counseled the Air Force and Congress not to place any hope on the success of long range ballistic missiles for many years, due to the technological problems involved.[102] Armed with this advice and a document, Operational Requirements for Guided Missiles, in 1947 the Army cancelled the only United States long-range ballistic missile project as an economy move.[103] Privately funded research continued at the Convair Aircraft Division of General Dynamics* until in January, 1951. The project was revived in the aftermath of NSC-68 and the outbreak of the Korean War.[104] (At this time the warhead would have weighed some 9000 pounds.) This program, MX-1593, code named Atlas, was for general research on a loosely defined intercontinental ballistic missile.[105]

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[101]The Regulus I grew out of Navy interest in the "Loon," developed from the German V-1. Chance-Vought began work on Regulus in 1948, and it was first flight tested in 1950. (Paolucci, D.A., "The Development of Navy Strategic Offensive and Defensive Systems," United States Naval Institute Proceedings, May 1970, vol. 96, no. 5., pp. 210-213, Green, World Guide to Combat Planes, vol. 2, pp. 43-45.)

[102]Adams, op. cit., pp. 9-10, Perry, p. 6.

[103]Adams, loc. cit.

*At that time it was the Consolidated Vultee Aircraft Corp., and the Atlas missile was named for the Atlas Corp., the parent company. The merger with General Dynamics came in 1954. Chapman, op. cit., pp. 75-76.

[105]Chapman, op. cit., pp. 60-61.

After the United States exploded its first thermonuclear device on November 1, 1952, the ICBM program was reviewed for possible acceleration. The Millikan Committee recommended that the specifications for ICBM's be relaxed, but the program should not be accelerated until design of the various components was completed.[106]

The three existing Air Force strategic missile programs were re-evaluated in the fall of 1953 with the intention of eliminating any non-productive efforts. The Air Force Strategic Missiles Evaluation (Teapot) Committee, chaired by Dr. John von Newmann, recommended that the ICBM program be expanded and accelerated in the light of the thermonuclear breakthrough. This would be necessary if the United States were to prevent "mortal danger" to the nation in the period 1959-1960. The Navaho and Snark, both intercontinental cruise missiles, were also continued. The Atlas project was reorganized and given new direction, but there was no crash program.[107]

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[106]The Millikan Committee was an ad hoc group from the Air Force Scientific Advisory Board that reviewed the implications of the successful thermonuclear detonation. The first device weighed sixty-five tons, so the AEC still had work to do its share of the components. Chapman, op. cit., p. 70, Schwiebert, E.G., A History of the U.S. Air Force Ballistic Missiles, Frederick A. Praeger, Publisher, New York, 1964, p. 68.

[107]The feasibility of weight reduction in thermonuclear weapons was demonstrated in a laboratory test in the summer of 1953. In Oct. 1953, von Newmann, wearing his other "hat" as head of the Air Force nuclear weapons panel confirmed the breakthrough in size and weight of nuclear weapons. A Rand Corporation study coincident with the Teapot Committee also expressed the belief that an ICBM could be operational between 1958-60. Schwiebert, op. cit., pp. 68-73, Chapman, op. cit., pp. 71-74, Perry, op. cit., pp. 10-13.

In 1955 several events occurred which quickened United States' interest in ballistic missiles. In May and June the Soviets displayed large new bombers in quantities that definitely impressed United States' observers.[108] In July or August a series of tests of medium and intermediate range ballistic missiles at Kapustin Yar, northwest of the Caspian Sea, were monitored by U. S. radars at Samsun, Turkey.[109] On November 23, the Soviets air-dropped a thermonuclear device.[110] With all of the eggs of the United States resting in the nuclear basket, the relative size and strength of the deterrent force was vital.[111]

The Killian Committee reported to the NSC on February 14, 1955, that the strategic balance would be in jeopardy by the "early 1960's" and the United States must speed up its missile

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[108] Aviation Week, May 23, 1955, op. cit., p. 14, July 11, 1955, op. cit., p. 13.

[109] Greenwood, Ted, "Reconnaissance, Surveillance and Arms Control," The International Institute for Strategic Studies, London, 1972, pp. 16-17.

[110] Kramish, op. cit., p. 125.

[111] Huntington, op. cit., p. 61.

programs and begin work on an IRBM. The National Security Council then reviewed the entire U. S. ballistic missile picture.[112]

In May, 1955 design studies for an intermediate range ballistic missile were solicited.[113] In October, the Atlas was given "the highest national priority" and Titan was contracted as a back-up.[114] Two IRBM projects, Thor and Jupiter, were approved in November, 1955.[115]

The Navy too had exhibited a strong interest in ballistic missiles, and the Killian Committee stated that "a national requirement existed for a sea-based ballistic missile."[116] The Navy endeavored to "buy in" to an existing program, and

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[112]The Technological Capabilities Panel, or Killian Committee, was established by the NSC at the direction of the President in the fall of 1954. It evaluated the offensive and defensive capabilities of both the United States and the Soviet Union given the recent advances in thermonuclear warhead technology. The Soviet Blast in August, 1953, and the U.S. detonation on 1 March, 1954, were both "dry" devices. Armacost, Michael H., The Politics of Weapons Innovation: The Thor-Jupiter Controversy, Columbia University Press, New York, 1969, pp. 50-51, Chapman, op. cit., pp. 72, 74, 84-85.

[113]Burgess, Eric, Long-Range Ballistic Missiles, The MacMillan Company, New York, 1962, p. 13.

[114]Ibid, p. 48.

[115]The IRBM programs were initiated to provide a more quickly deployable missile than the ICBM, and as a hedge against the failure of Atlas. Both IRBM's drew heavily on technology developed in other programs. Thor used many Atlas components, and Jupiter was a scaled-up version of the Army's Redstone tactical missile. Schwiebert, op. cit., p. 64, Perry, op. cit., p. 16, Bottome, Balance of Terror, pp. 94, 98-99.

[116]Sapolsky, Harvey M., The Polaris System Development, Harvard University Press, Cambridge, 1972, pp. 18-19.

in November 1955 the Secretary of Defense approved joint partnership with the Army in the Jupiter program. The Army missile proved to be patently unsatisfactory for shipboard use. As soon as Navy solid propellant technology demonstrated the feasibility of a solid fueled missile, the Navy began to seek a program of its own.[117]

In the summer of 1956 the Chief of Naval Operations sponsored a National Academy of Science Committee on Undersea Warfare summer study to examine the "growing Russian submarine menace." The committee exceded its antisubmarine warfare charter somewhat by recommending the development of a fleet of missile-firing submarines based on anticipated technological developments.[118] After further feasibility studies the Secretary of Defense approved the Polaris fleet ballistic missile program on December 8, 1956. In May 1957 it received the highest national priority.[119]

Ballistic missile development produced a need for precise geographic location information that had not previously existed. Geodetic datum information about the Soviet Union was inaccurate. In the USSR in 1956 two datums existed that were not connectable due to error.[120] To correct this

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[117] Ibid., pp. 22-28.

[118] Ibid., pp. 28-30.

[119] Ibid., pp. 33-34.

[120] Gantz, Kenneth F., ed., The United States Air Force Report on the Ballistic Missile, Doubleday and Co., Garden City, N.Y., 1958, pp. 262-263.

deficiency and to provide other targeting information, U-2 aircraft began operating over the Soviet Union after June 1956 in a "unilateral version" of the "open skies" program.[121]

F. SOVIET BALLISTIC MISSILE DEVELOPMENT

The Soviet missile effort had received a gigantic boost from captured German scientists, hardware, and facilities as did the aircraft industry.[122] German scientists and engineers repatriated in 1951-52 told stories of the development of 120 metric-ton-thrust rocket engines and of Soviet interest in 250 ton engines.[123] Other stories began to circulate of Soviet tests of an 800 mile range missile. This information was given enough credence by the United States for the high priority installation of an AN/FPS-17 radar at Samsun, Turkey. This radar was for the express purpose of monitoring Soviet IRBM/MRBM tests at Kapustin Yar. When this system bacame operational in the summer of 1955, it disclosed missile firings at increasingly frequent intervals. On the basis of

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[121]The Soviets had rejected Eisenhower's "Open Skies" proposal of 1955 for joint inspection as a disarmament device. U-2 development had been approved in December, 1954, and it made its first flight in August, 1955. Quester, op. cit., p. 109, Wise, David and Ross, Thomas B., The U-2 Affair, Bantam Books, New York, 1962, pp. 30-31.

[122]Lee, Soviet Air and Rocket Forces, pp. 148-152.

[123]Schwiebert, op. cit., p. 67.

continued observation it was concluded that the two systems being tested, SS-3 and SS-4, went into series production in 1956.[124]

In the United States, ballistic missile development did not proceed at a very rapid pace until after the breakthrough in warhead size. The Soviets had chosen a different course. After their initial experiments in rocket engine development, the Soviets elected to skip the building of a "medium size" rocket and jumped to very large ones to accommodate their very large warheads.[125] By 1954 the Soviets had frozen the design of their first ICBM while their state-of-the-art in thermonuclear technology indicated that a warhead of gigantic proportions would be required.[126] This was to give them an initial advantage in the "space race" but would cause future

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[124]The test pattern changed from irregular firings to a regular rate of five per month indicating production line sampling by 1956. Greenwood, op. cit., p. 16, Aviation Week, Feb. 20, 1956, vol. 64, no. 8, p. 26, Aviation Week, Oct. 20, 1957, vol. 67, no. 16, pp. 26, 27, Wolfe and Ermarth, op. cit., p. 268.

[125]Adams, op. cit., p. 11, Hilsman, Roger, To Move a Nation, Doubleday and Co., New York, 1967, p. 162.

[126]Murphy, Charles J. V., "Khrushchev's Paper Bear," Fortune, Dec. 1964, vol. 70, no. 6, p. 227.

problems as a weapon system.[127] This missile, the SS-6, was first tested in August 1957.[128]

G. STRATEGIC AIR DEFENSE IN THE SOVIET UNION

One of the phenomena which grew out of the Korean experience was the accelerated expansion of the Strategic Air Command in the United States. Under Khrushchev and in the face of hydrogen bomb development, Soviet response to this came in the form of a major expansion of its strategic air defenses.

One problem which faced the Soviets was that of coping with a bomber attack in a high-altitude, all-weather environment. Korea had shown the vulnerability of the piston engined bombers, but the United States was then deploying the faster and higher flying jet B-47's from forward bases ringing the Soviet Union. Additionally, the B-52 was then approaching the operational stage of its development.

To meet the challenges PVO was given added emphasis, and for the first time in Soviet history was made a separate

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[127] Hilsman, loc. cit.

[128] A frantic search had been conducted in early 1957 by the U-2's for the Soviet ICBM test facility. Other intelligence sources had indicated that a test was approaching before the site was finally located at Tyura Tam, 680 miles east of Kapustin Yar. The Soviets' first ICBM was photographed on its launch pad by the U-2's and the FPS-17 radar tracked it in flight. Sputnik I was also observed in this manner. Murphy, "Khrushchev's Paper Bear," loc. cit.

component of the armed forces in late 1954 or early 1955.[129] It was felt that a new day fighter and an all-weather interceptor both measurably superior to the MIG-15 and MIG-17 should be developed. Work had long been underway on both the MIG-19 and the YAK-25 which would fill the interim need. The YAK-25 made its appearance in 1952, and the MIG-19 prototype flew for the first time in 1953.[130] While both of these aircraft were credited with some all-weather capability, the MIG-19 was no improvement over the later models of the MIG-17's for all-weather interceptions. This meant it essentially lacked any such ability. The YAK-25 had better all-weather performance, but it too fell far short of desired capabilities. It was produced in numbers only because the Soviet state-of-the-art was incapable of turning out anything better. The

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[129]The post-Korean War reorganization of the Soviet armed forces which created the PVO as a separate component marked an important step in improving its capabilities. As a separate service PVO now included strategic anti-aircraft artillery, surface-to-air missiles, radar and ground-observer nets, fighter divisions with special training in air defense, and other components of the Soviet air-defense system. (See Lee, Soviet Air and Rocket Forces, pp. 126, 178, and Kilmarx, op. cit., pp. 265-266.)

[130]All weather capabilities were almost non-existant in the Soviet Union until the YAK-25 reached operational squadrons in 1955. As designed it was intended to intercept such targets as the Vickers, Valiant, and B-47. Its counterpart the MIG-19 day fighter utilized two axial-flow engines to achieve the needed power. The Soviet aircraft industry still lacked turbojets suitable for fighter aircraft in the 10,000 pound thrust catagory. Nevertheless, the MIG-19 was a superior fighter to its predecessors, the MIG-15 and MIG-17. (See Lee, Soviet Air and Rocket Forces, pp. 141-142, and Green, World Guide to Combat Planes vol. one, pp. 133-134, 178-180.)

Soviets' inability to produce effective airborne interception equipment still remained the major stumbling block in this area.*

Notwithstanding, both of these aircraft became operational in 1955.[131] At that time efforts were underway for further development and refinement of fighter-interceptor capabilities. Development of three new aircraft, the MIG-21 Fishbed, the SU-7 Fitter, and the SU-9 Fishpot was accelerated. Prototypes of all three were seen in the June 1956 Tushino Aviation Day flyover.[132] None of these aircraft was to gain an operational status until the end of the decade, however. Only the SU-9 was to have the badly needed but still deficient all-weather capability.[133]

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*By the time the YAK-25 became operational it was considered obsolete by many western observers. (See Aviation Week, July 18, 1955, vol. 63, no. 3, p. 16.)

[131]Lee, Soviet Air and Rocket Forces, p. 142, Green, World Guide to Combat Planes vol. one, pp. 133, 178, Swanborough, op. cit., pp. 91, 121.

[132]At this particular air show the Soviets introduced four new fighters, all except one of which became operational. The one which failed to reach an operational stage was a non-delta winged MIG-21. (See Swanborough, op. cit., pp. 90-91, Green, World Guide to Combat Planes vol. one, pp. 136-142, 172-176, Hotz, R., "Soviets Show Twining Eight New Planes," Aviation Week, July 2, 1956, vol. 65, no. 1, p. 26, and Aviation Week, July 9, 1956, vol. 65, no. 2, pp. 30-32.

[133]Initial production aircraft of this model had a small conical radome above the air intake. Later models had the radome in the center of the air intake. It was designed to fulfill the single-seat all-weather interceptor role. (See Taylor, J.W.R. and Swanborough, G., Military Aircraft of the World, Charles Scribner's Sons, New York, 1971, p. 130, Green, The World Guide to Combat Planes vol. one, pp. 175-176, and Swanborough, op. cit., p. 112.)

By 1955 the Soviets possessed a large and still expanding strategic air defense system. Improvement of the radar screen surrounding the Soviet Union continued. Given its new autonomy and upgraded importance PVO had thousands of highly trained fighter pilots assigned to it and for the first time achieved some all-weather capability. PVO swelled in size to over half a million personnel by 1956.[134] It had a force of over 10,000 radar-guided anti-aircraft guns, and surface-to-air missile batteries were increasing in number. More than 20 regional commands had been established to control the defensive network throughout the Soviet Union. Thousands of day fighters and all-weather interceptors were committed to the defense of the homeland. Additionally, construction of an early-warning radar net similar to the DEW Line was undertaken.[135]

Though far from complete the Soviet strategic defensive system made some major strides forward and constituted a challenge to the bomber force of SAC for the first time.*

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[134]In 1956 there were 550,000 people in Soviet air defense--about four times the number engaged in U.S. defenses at that time. (See Stone, op. cit., p. 91.)

[135]The Soviet air defense system has some 20,000 miles of border to protect. In an effort to decentralize control and thus allow individual on-scene commanders to direct defensive forces as the situation dictates, the Soviets divided the air defense areas of responsibility up between 20 different commands. These sectors are irrespective of Army regional commands. (See Lee, The Soviet Air and Rocket Forces, pp. 125-127, and Kilmarx, op. cit., p. 267.)

*Being more defense minded and faced with a more credible bomber threat, the Soviets have spent considerably more for air defense than has the U.S. The best estimates say that the Soviets have spent, through 1970, about $75 billion, in contrast to $30 billion on air defense in the U.S. (See York, op. cit., pp. 190-191.)

As in the United States, work had been underway in the Soviet Union on a sirface-to-air missile. Efforts to refine the German made Wasserfall and Rheintochter missiles, captured in World War II, now began to bear fruit as the SA-1 and SA-2 missiles finally became operational.[136] By the time PVO was reorganized a limited number of missile batteries were coming into service.

One final area of defense bears mention. Commencing in the mid-1950's the Soviets increased the emphasis placed on civil defense. This increased attention paralleled the expansion of the PVO programs discussed above and was to carry over into the next decade. Programs which required lengthy warning time for mass evacuation of the population continued even after the advent of the ICBM whose short warning time would preclude their execution.

H. STRATEGIC AIR DEFENSE IN THE UNITED STATES

Despite policy directives and a critical need for strategic air defense in the United States, it was grossly inadequate prior to 1953. There were a number of reasons for its inadequacies. As late as 1952 the technological problems of continental defense seemed insurmountable in light of nuclear weapons proliferation. Thermonuclear development would only exacerbate the problem. Secondly, the Korean War placed a

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[136]The SA-1 surface-to-air missiles evidently proved unsatisfactory as they were only deployed around Moscow. (See Wolfe and Ermarth, op. cit., p. 268.)

higher demand on resources. Not only did the immediate needs of the war have to be met, but the perceived threat to Europe drew further from available resources. The threat of attack to the continental United States still seemed remote. The tradition and doctrine of the American fighting forces had long been offensively oriented. The United States had not been a probable target for attack since the War of 1812. One final reason for the air defense shortcomings had been the Air Force opposition, previously discussed. In the early years of the Korean War they had been far more concerned with the build-up of SAC and its offensive roll.[137]

The Eisenhower Administration was to change all this. The critical decision to reorient the national priorities to include a vastly expanded and improved air defense system was made in October 1953. The Soviet thermonuclear test in August broke the back of resistance to air defense within the administration.[138] The recommendations of the 1952 Summer Study Group were approved. A commitment was made to reorganize the

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[137]For further explanation as to why air defense had not previously been built-up to a sufficient level, see Huntington, op. cit., pp. 326-328, and Snyder, "New Look," pp. 420-421.

[138]It was the Soviet thermonuclear explosion which triggered action on continental defense. Only after the blast did Administration officials take the steps necessary to address the problem with specific action solutions. Two weeks after the Soviet blast, Admiral Radford, Chairman of the Joint Chiefs of Staff, declared that the Soviet bomb meant that the U.S. must review and strengthen its air defenses. On Oct. 6, 1953 the NSC approved NSC-162, the instrument necessary to implement an effective air defense system. (See Huntington, op. cit., pp. 333-335.)

continental defenses on an integrated basis and give them extensive budgetary support. It was this commitment which marked the turning point for strategic air defense in the United States.

Radar coverage in the existing defense system had long been shallow or even nonexistant despite the earlier deployment of the Lashup and Permanent systems. In an effort to expand the radar coverage, the Air Force embarked upon a "double perimeter" system of two lines of radars to provide protection for the three most vital areas of the country--the Northwest, California, and the Northeast. This entailed large expansions of the Permanent System. To facilitate its early operation the Air Force utilized mobile ground radar units enabling them to have the system fully operational by 1957. This system left low altitude gaps in the radar coverage. Therefore the Air Force approved the Gap Filler program in 1954. This effort was to place some 300 small automatic radar stations between the larger units.[139]

Earlier negotiations secured an agreement with Canada for the construction of the Pine Tree Line. It was completed in 1955. That same year the United States initiated a crash program to construct six new interceptor bases just below the Canadian border. By June 1957 five of these bases were operational.[140]

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[139]Modifications of the program delayed its completion, but it was in operation by 1957. It was not yet fully completed, however. (See Goldberg, op. cit., p. 133.)

[140]Ibid., p. 194.

As early as 1948 an early-warning line across Canada had been suggested by air defense planners. In 1952 the Summer Study Group, an outgrowth of the Charles Report the previous year, stated the belief that the nation could achieve a strong air defense posture if given from three to six hours warning of a pending bomber attack. This amount of warning, it was concluded, could be obtained through the construction of a northward early-warning network. They specifically recommended construction of the DEW Line.[141] The Summer Study Group had estimated its cost to be about $370 million and called for a crash program which would allow it to be operational by 1954.[142] The Air Force and the Department of Defense did not feel the need for such a program. President Truman in 1952, however, approved a National Security Council policy statement calling for its construction. A commitment in terms of budgetary allocations did not follow until the next administration. The Eisenhower Administration's endorsement of the Summer Study Group recommendation in late 1953 moved the United States toward the active expansion program of air defense in the mid-fifties. The desire for an artic radar warning system finally culminated in an agreement with Canada in 1954 for construction of the DEW Line. Similar negotiations brought about the construction of the Mid-Canada Line.[143]

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[141] Goldberg, op. cit., p. 135.

[142] Ibid.

[143] See Huntington, op. cit., p. 340 and Goldberg, op. cit., pp. 133-135.

Lengthy public debates ensued over DEW Line construction, and some cost estimates went as high as $150 billion for installation and maintenance. Nevertheless, in 1954 the Eisenhower Administration made the final decision to build the DEW Line and construction began early the next year.[144] This program of construction was accelerated as the same phenomena which created the "bomber gap" worked to expand the ADC.[145] The DEW Line became operational on August 1, 1957.

Additional impetus for the accelerated construction had come from the 1954 Rand study, previously discussed, which discouraged the use of forward bases by United States strategic bombers. With the B-52 becoming operational in 1955 and flying from American bases, air defense was further emphasized, especially the need for early warning.[146]

This meant that closer cooperation between the United States and Canada was needed. The North American Air Defense Command (NORAD) was established in September 1957 as a combined U. S. - Canadian Command. It provided the coordination between the three different early warning networks. Without such a structure control would have been very difficult.[147]

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[144]Goldberg, op. cit., p. 135.

[145]Wolfe and Ermarth, op. cit., p. 63, and Conant, op. cit., p. 16.

[146]Conant, op. cit.

[147]See Huntington, op. cit., p. 340 and Goldberg, op. cit., pp. 133-135.

Additional coverage was gained by using airborne early-warning and control aircraft, radar picket ships and the construction of "Texas Towers" some 100 miles off shore between New Jersey and Nova Scotia.[148]

By 1954 all ADC Squadrons had received second generation all-weather fighter-interceptors--F-86D's, F-89D's or F-94C's. At that time there were some 55 ADC fighter squadrons each with 25 aircraft. By 1956 the F-102A's and the F-89H's became operational with the Falcon air-to-air guided missile.[149]

The Nike-Ajax surface-to-air anti-aircraft missile system which was started in 1945 had begun to be deployed in 1954. With the 1953 air defense decision the program had received a high priority rush to get it deployed as rapidly as possible.[150]

A feasibility study for an anti-ballistic missile system was completed in October 1956 and stated that the system looked promising. By September 1957 Nike-Zeus was entering the component development stage.[151]

One further attempt at strengthening continental air defense came out of the 1953 Eisenhower Administration decision. Lincoln Laboratories had proposed a system which would

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[148]See Goldberg, op. cit., p. 136, and Quester, op. cit., p. 102-103.

[149]The Falcon missile (GAR-1) was the first operational air-to air missile in the Air Force. It was extensively deployed within the ADC by 1956. (See Goldberg, op. cit., pp. 132, 209.)A

[150]Aviation Week, May 10, 1954, vol. 60, no. 19, p. 18.

[151]Adams, op. cit., p. 20-25.

correlate all air defense data and air defense efforts--the Semi-Automatic Ground Environment (SAGE) system.

It was to consist of some twelve command centers located around the perimeter of the United States. Each command center would have its own separate computer complex whose function it was to process, store, and display air surveillance information and determine the optimal way to deploy forces against an attack--either fighter aircraft or missile batteries.[152] The command centers were all connected to NORAD headquarters.

From the beginning SAGE was plagued with computer softwear problems which were never solved, even though SAGE is still in operation today.* By the end of the decade the introduction of the ICBM had ended its effectiveness. Control centers were never hardened and the use of a few ICBM's could effectively allow an unhampered bomber attack to be prosecuted. In the later years of the Eisenhower Administration SAGE funding and importance was sharply curtailed when it became obvious that it would be obsolete before it was ever completed.[153]

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[152] York, op. cit., p. 189.

*The number of manhours required for programming of the SAGE software was underestimated by 6,000 man-years at a time when there were only about 1000 programmers in the world. The program was literally never debugged and integrated into the system. (See Chayes, Abram and Wiesner, J. ed., ABM: An Evaluation, Harper and Row Publishers, New York, 1969, p. 121.)

[153] York, op. cit., pp. 155, 189-190.

V. THE MISSILE GAP: 1957-1961

A. THE BOMBER GAP ENDS

By early 1957 fears of a "bomber gap" began to recede. The various intelligence agencies had been keeping a close watch on Soviet aircraft production, and with the initiation of the U-2 program in 1956, it soon became obvious that Soviet bomber production was not as great as predicted. The U-2 aircraft had located the heavy bomber factories and their operational air fields. By actual count output was found to be modest--well below the production rate of the B-52.[154] At that point production in the United States was slowed down. Evidence also indicated the performance of the new Soviet bomber was less than satisfactory. For that reason the Soviet leadership apparently decided to limit bomber production, and the "bomber gap" never materialized.[155]

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[154]The Soviets built less than 20 percent of the heavy bombers of which intelligence estimates had said they were capable of producing. (Bottome, The Balance of Terror, p. 41, Murphy, "Khrushchev's Paper Bear," op. cit., pp. 224-227.)

[155]Another hypothesis for the Soviets failure to fully mobilize their production capacity for bombers is they produced only those weapons they felt were necessary to deter an attack by the United States. This theory is not as widely held, however, and it is generally agreed performance problems were the primary reason for the limited production of the big bombers. (Bottome, The Balance of Terror, pp. 41-42, Dulles, op. cit., p. 151.)

The Soviets only produced about 150 Bisons and 100 Bears, far short of anticipated numbers.[156] They did ultimately produce some 1,000 Badgers, but like the B-47, forward basing or inflight refueling would be required for a long-range strike. Neither was at hand.

In retrospect it appears that the Soviet Union attempted to create an illusion of strength to conceal its weakness in long-range delivery systems. They succeeded all too well. Their efforts spurred the United States into a massive build-up of strategic bomber forces. When the "bomber gap" did appear, it appeared in favor of the United States by about a five-to-one ratio.[157]

B. LESSONS NOT LEARNED

From this experience one would expect that the Soviets would have learned that it was extremely dangerous to escalate a "paper arms race" because of American sensitivity to threats to its strategic superiority. Nevertheless, they were to repeat exactly the same error with exactly the same results. Thus the myth of the "bomber gap" and its intrinsic fears was replaced in 1957 by the myth of the "missile gap." The only difference was that this time the delivery vehicle was the

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[156]Earlier estimates had said the Soviets could produce about 1,000 of each of the three types of new bombers. Only the TU-16 Badger was to meet this expectation and it offered little threat to the U.S. (Quester, op. cit., p. 145, Bottome, The Balance of Terror, p. 36.)

[157]Bottome, The Balance of Terror, p. 36.

ballistic missile and the result was a fourteen-to-one Soviet deficit by September 1961.[158]

Three events in 1957 led to the "missile gap." These were the failure of the "bomber gap" to emerge, the successful launching of a Soviet ICBM, and Sputnik.

The "bomber gap" had produced two effects in the United States. First it rekindled what might be called a Pearl Harbor psychosis, whereby the military and civilian leadership was willing to believe the Soviets were intent upon perpetrating a surprise attack upon the United States with a soon to be superior intercontinental nuclear bomber force. Secondly, with this psychological mind-set established, when the "bomber gap" failed to materialize there was a willingness to believe it failed to do so because the Soviets were diverting all their resources to ICBM production in an effort to by-pass the United States in strategic capabilities.

In August 1957 the Soviets successfully tested the first ICBM. The United States Air Force had attempted to fire an Atlas ICBM on June 11 but had failed.[159] On October 4 the Soviet Union placed the first earth satellite in orbit--Sputnik I. This 184 pound orb caused a great deal of public concern in the United States, but the Eisenhower Administration

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[158]Exact missile numbers for this period differ greatly among sources. Best estimates credit the U.S. with about 174 strategic missiles targeted on the Soviet Union at a time when they had fourteen missiles targeted on the U.S. (Bottome, The Missile Gap, Fairleigh Dickinson University Press, Teaneck, N.J., 1971, p. 232, Greenwood, op. cit., p. 10.)

[159]Attempts to flight test Atlas again on Sept. 25 failed. The first successful flight test of a Series A Atlas missile finally came on Dec. 17, 1957 after Sputnik I and II were in orbit. (Schweibert, op. cit., pp. 221-222.)

refused to be swayed from the existing missile program timetable or funding. The placing of Sputnik II, a 1120 pound dog-carrying satellite, in orbit in November that same year could not be so easily pushed aside.[160] From that point on, and indeed as early as October 4 for many, it was commonly held in the United States that the Russians would mass produce ICBM's, and would have roughly 1000-1500 intercontinental-range missiles by 1961-1962. The United States would have less than 100 such weapons by that time. In a surprise attack the strategic striking force of the U. S. could be eliminated.[161] The one-sided missile race was on.

C. MISSILE EFFORTS IN THE UNITED STATES

In February 1954 the Air Force Scientific Advisory Board, headed by Dr. John von Newmann, had released a report which was a re-evaluation of many of the assumptions of missile feasibility. Earlier pessimistic predictions of missile accuracy and payload requirements were wrong. Missiles would not have to weigh some 300 tons and be powered by seven engines to carry a nuclear warhead weighing four and one-half tons.[162]

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[160] Aviation Week, Oct. 14, 1957, vol. 67, no. 15, p. 27, Aviation Week, Nov. 11, 1957, vol. 67, no. 19, p. 29, Quester, op. cit., p. 149.

[161] Weapon estimates of projected Soviet strength varied greatly as the "missile gap" emerged. Some sources projected Soviet strength by 1961 as low as 150-200 ICBM's while others were crediting them with as many as 1500. (Bottome, op. cit., p. 40, Phillips, T.R., "The Growing Missile Gap," The Reporter, Jan. 8, 1959, vol. 20, no. 1, p. 11, U.S. News and World Report, Jan. 23, 1961, vol. 50, no. 4, p. 66.)

[162] Murphy, "America's Widening Military Margin," Fortune, August 1957, vol. 56, no. 2, p. 226.

The von Newmann report had told the Air Force what it wanted to know: accuracy was improving and a smaller, lighter, and more powerful warhead could be expected. The improved warhead was in the form of the "dry bomb" which proved to be the breakthrough needed if missiles were ever to be practical.[163]

The report served as the necessary catalyst to lift the Atlas project, the only U. S. ICBM program in existance at that time, out of research and into development as a weapons system. The program was still critically short of funds, but received additional impetus with the successful testing of a "dry bomb" only a month after the von Neumann report was released.[164] Nevertheless, in 1954-1955 the budget for missiles still rested in the millions of dollars while manned bombers received the lion's share of the appropriations--in the billions of dollars.[165] This was in keeping with the Eisenhower Administration's concept of a balance between defense and economy with emphasis on strategic bombers.

Following the Killian report in 1955 (previously discussed) missile development was vastly expanded and given the highest national priority.* But this was still the era of the "bomber

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[163] Chapman, op. cit., p. 73.

[164] Ibid., p. 74.

[165] Quester, op. cit., p. 147.

*The significance of such a priority can be misleading. This did not necessarily mean that missiles were to receive boundless funding. It meant that for a given budget, allocation of funds between missiles and other weapons, missiles would have first claim on the margin of material or manpower resources that had been allocated. (Quester, op. cit., p. 147.)

gap," and not until the new Soviet threat manifested itself with the Russian's successful ICBM test in 1957 was the pattern of funding to be significantly altered.

In October 1955 the Atlas program was accelerated, and Titan was contracted for as insurance against failure or unacceptable delay. Prior to 1958 there was never an intent by the Air Force to deploy more than 100 missiles to operational sites, and initial deployment of only 20 to 40 missiles was contemplated.[166] Expense and the vulnerability of such weapons became an increasing concern to the United States. These surface stored or surface fired weapons could not withstand attack. A less vulnerable system was believed needed in the next generation of missiles.

In early 1957 President Eisenhower had commissioned a group to investigate the role of civil defense in overall United States defense policy. Their conclusions were based on an analysis of Soviet technological capabilities. In October 1957 this group, later known as the Gaither Committee released a report, supported by intelligence estimates, which predicted that as early as 1959 or early 1960 (not the 1961-1962 predicted by the von Neumann Report) the Soviets could deploy enough ICBM's to destroy the United States' strategic retaliatory capability.

The barrage of Soviet technological successes in 1957 had a tremendous psychological impact in the United States.

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[166]Perry, op. cit., p. 14.

Earlier fears of a Soviet leap into strategic weapons superiority seemed more real. Indeed, one of the von Newmann assertions had been that the ICBM would guarantee penetration of any known defense, and in a surprise attack Soviet technology might soon allow them to eliminate the bomber force and any fledgling missile sites in existence.[167] The fears expressed by the Killian Committee and the Gaither Committee now seemed all too real.

United States' intelligence had confirmed Khrushchev's earlier boast that the Soviets had successfully fired an ICBM over a distance of 4,000 miles, enough to reach the continental United States. Additionally, intelligence reports confirmed that the Soviets had fired more than 500 rockets in the 500-1000 mile range in the preceding two years. From this it was concluded that Soviet scientists had mastered the fundamentals of missile technology and that production was already on a heavy scale.[168]

Though classified "Top Secret," the Gaither Report was leaked to the public and further stimulated debate on the "missile gap." Throughout these debates, President Eisenhower refused to accept the conclusions of the Committee. This only fortified a belief held by committee members that the

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[167] Quester, op. cit., p 146.

[168] Murphy, Charles J. V., "The White House Since Sputnik," Fortune, January 1958, vol. 57, no. 1, p. 99.

Administration failed to fully appreciate the full extent of the Soviet threat as described by the Pentagon and the CIA.[169]

Once leaked the report brought cries from both political camps that the United States had suffered a severe technological defeat which had nullified its nuclear advantage and set the country some five years behind the Soviets.[170] Additionally, Air Force intelligence estimates which bolstered the position calling for more rapid augmentation of various strategic forces were made available to Congressional critics of the Administration. This served to increase the public demand for more of the expensive and already obsolete liquid-fueled missiles.[171] Throughout the debates the President stood his ground, refusing to accelerate missile programs beyond their present stage, always claiming to have access to different intelligence information.

In July 1959 the then Secretary of Defense, Neil McElroy, told Congress that a "missile gap" did in fact exist as Administration critics claimed, and a three-to-one Soviet advantage would exist by 1961. He further stated, however,

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[169]President Eisenhower admitted this report indicated the retaliatory forces of the United States would become vulnerable by 1959, but rejected this saying he had "other information." (Bottome, The Balance of Terror, p. 46, Bottome, The Missile Gap, p. 47n, Halperin, M.H., "The Gaither Committee and the Policy Process," World Politics, April 1961, vol. 13, no. 3, p. 364.)

[170]Murphy, "The White House Since Sputnik," op. cit., p. 100.

[171]Quester, op. cit., p. 194, Bottome, The Balance of Terror, op. cit., p. 53.

that the United States had an ample deterrent to any attack--the standard Administration answer to its "missile gap" critics.[172]

It had been determined that the first-generation liquid-fueled ICBM's were too large, expensive, and slow to react to be efficiently utilized if mass produced. The decision had been made to produce only a limited number of these missiles while awaiting a development of the far more promising second-generation ICBM's. In the interim the main thrust of United States' nuclear deterrent would still have to come from strategic bombers.

Anticipated technological achievement and the cost of the first-generation missiles inspired a third major intercontinental ballistic missile system--Minuteman.[173] Minuteman I and Polaris, (previously discussed) were developed almost in parallel after Navy solid fuel technology demonstrated the feasibility of solid-fuel missiles. The Polaris crash program began in January 1957, and Minuteman I followed in February 1958.[174]

The Navy's program was never in serious doubt, but Minuteman I development competed for funds with Atlas, Titan I, and

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[172]The transcript of these hearings were never made public, but the Secretary of Defense apparently did make such a statement even though Administration policy rejected the existance of a "missile gap." (Bottome, The Balance of Terror, pp. 49-50, Quester, op. cit., p. 194.

[173]Minuteman was the first Air Force missile to exploit fully the advances made in miniaturization and solid fuel technology. (Perry, op. cit., pp. 18-18.)

[174]Wolfe and Ermarth, op. cit., p. 54.

Thor. Before Sputnik, Minuteman I could have been developed only at the price of eliminating one or more of the liquid-fueled missile programs.[175] The advantages offered by the solid-fuel missile would have probably overcome this obstacle without the Sputnik scare factor. Minuteman I was much less expensive than either Atlas or Titan I, and its smaller size made it easily adaptable to hardened site deployment. This meant it offered a reliable second strike capability. Additionally, its solid-fuel propellant gave it a quick reaction time.

Minuteman I had one disadvantage which was common to all ICBM's of that period. It had no retargeting capability. Because of the inability of the onboard computer to accept more than one target, Minuteman I's target information could not be readily changed to take advantage of knowledge of earlier firing malfunctions.

Sputnik made any argument against Minuteman I academic. In the outcry that followed, Administration resistance disappeared, and the approval of the new missile did not mean the abandonment of one of the liquid-fuel missile programs. In

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[175]Perry, op. cit., p. 19.

fact, Atlas, Titan I, and Thor, all in production, were accelerated. The same was true for the developmental programs of Minuteman I, Polaris, and Titan II.*

Under the accelerated programs the first twenty-seven Atlas D's entered service in 1959. Twenty-seven more of the follow-on Atlas E's, a hardened version of the "D" model, were in service by the early sixties. Fifty-four "F" model Atlas missiles were deployed in 1963. The Titan I missile became operational in April 1962, and fifty-four were deployed. Its successor, the Titan II, became operational in 1963 and fifty-four of these missiles were deployed. Titan II was eventually the only liquid-fueled missile to remain operational after Minuteman deployment began.[176]

In 1958 the Air Force planned to deploy some 400 Minutemen as they began entering service in 1961. Two years later the number had risen to 800 planned by 1962. Plans eventually called for 1300 Minuteman missiles to be deployed by fiscal year 1966. The Joint Chiefs of Staff had recommended as many

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*Titan II was in the "Study Stage" in 1957. Like Titan I it was to be deployed in hardened sites. Unlike Titan I though, Titan II was to be fired from within the silo and not first elevated to the surface. The sites were hardened to 100 psi, the same as the first Minuteman sites. Arguments that Minuteman I could do the same job at far less cost were rejected because Titan II could carry a much larger payload. Development continued, and the missile became operational in June 1963. (Schwiebert, op. cit., p. 122.)

[176]The earlier Atlas and Titan models were scheduled to be phased out by the end of 1965. (Stone, op. cit., p. 130.)

as 3000 of the missiles, but only 1000 Minutemen were eventually deployed.[177]

Believing that a "missile gap" would exist, the first order of business had been to get a workable IRBM deployed until ICBM's became available--thus, Thor and Jupiter. Both missiles were fallouts of existing missile programs, and it was planned to deploy about 1000 of these IRBM's to Europe for NATO forces as they became available. Thor became operational on September 19, 1958 and was immediately deployed to the United Kingdom, and Jupiter was deployed to Italy and Turkey in 1959.[178]

The acceptance of these 1500 mile-range missiles by the NATO allies was considered sufficient to deter any Soviet threat at least until ICBM's went into place. Intelligence estimates continued to reduce the expected number of Soviet ICBM's and to move their operational date back. Thus, there was no attempt to install IRBM's in other than these three countries. Even though these missiles were obsolete, inaccurate, and very vulnerable they adequately served their purpose and remained until 1962.[179]

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[177]Secretary of Defense McNamara considered 1,000 Minuteman missiles more than necessary, but the smallest figure politically acceptable in the face of a Joint Chiefs recommendation of 3,000. (Tammen, Ronald L., MIRV and the Arms Race, Praeger Publishers, New York, 1973, p. 104.)

[178]Burgess, op. cit., p. 38, Wolfe and Ermarth, op. cit., p. 55, Armacost, op. cit., p. 202.

[179]Hilsman, op. cit., p. 202-203.

D. BOMBER PROCUREMENT IN THE MISSILE GAP

The acceleration of missile programs was not the only United States reaction to the "missile gap." The Air Force received about forty-five percent of the total military budget from fiscal year 1955-1959.[180] Of this, a sizeable portion went to the bomber command who, even though the "bomber gap" myth had long been dispelled, were still urging greater acquisitions of B-52's and the new B-58 bombers.*

The Air Force took delivery of nearly 500 E, F, G, and H model B-52's between October 1957, and June 1962.[181] Of these, the G and H models were equipped with more effective penetration aids and designed to carry the Hound Dog missile, a subsonic, air-breathing, cruise missile with a range of about 700 miles.**

In December 1957 the contract for the B-70 was let as a follow on to the B-52. It was to have speed of 2300 miles per hour and an altitude capability of 70,000 to 75,000 feet. The concept was never bought, and it was canceled as a weapon

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[180] Bottome, The Balance of Terror, p. 30.

*The high speed B-58 was an outgrowth of the "bomber gap." The decision to develop it came after U. S. officials observed the MI-4 flyover. It became operational in 1960. (Caidin, op. cit., p. 47, Aviation Week, May 24, 1954, vol. 60, no. 21, p. 13.)

[181] In all, 744 of these aircraft were procured. (Green, op. cit., vol. 2, pp. 34-36, Stone, op. cit., p. 78.)

**Hound Dog was developed after U-2 photography had shown massive air defenses surrounding Soviet targets. The missile became operational in 1960. (Swanborough, op. cit., p. 16, and "Military Balance 1968-1969," p. 28.)

system in 1959. Production of two prototypes continued, but the aircraft never became operational.[182]

E. RECONNAISSANCE EFFORT IN THE UNITED STATES

In the year following Sputnik a contract was let for a high-speed follow-on to the U-2--the SR-71. First flown in 1960, this Mach 3 aircraft could cruise at 100,000 feet, but still could not provide all of the reconnaissance coverage deemed necessary. In March 1955 the Air Force, under CIA sponsorship, had issued requirements for a reconnaissance satellite designated WS-117L. The contract for its Agena self-powered satellite vehicle was awarded to Lockheed in 1956. Agena was then coupled to a Thor missile for testing in the "Discoverer" series. The project did not meet with success until Discoverer 13. The next vehicle, Discoverer 14, was recovered on August 19, 1960, and produced the first satellite pictures of the Soviet Union. This was only three months after Powers was shot down deep inside the Soviet Union. Reconnaissance coverage continued almost uninterrupted.[183]

Two more Discoverer satellites were recovered in 1960. A radio-transmission camera system redesignated SAMOS (Satellite and Missile Observation System) using an Atlas/Agena combination

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[182] Jones, op. cit., pp. 235-237.

[183] Greenwood, op. cit., pp. 9-10.

entered a polar orbit on January 31, 1961. Within a few days SAMOS II provided full coverage of the Soviet Union.[184]

F. BALLISTIC MISSILE DEFENSE

In 1957 Congress had authorized the Air Force to develop a missile detection system, and a contract was let in January 1958. The Ballistic Missile Early Warning System (BMEWS) was ultimately to consist of three radar sites at Clear, Alaska, Thule, Greenland, and the Fylingdale's Moor, England.[185]

The Thule site became operational in December 1960, and the Clear, Alaska site was operational in September 1961. The third site at Fylingdales, England went into operation in September 1963. The three-thousand mile range of BMEWS radar does not provide full coverage of the Soviet Union, but does afford early warning of Soviet ICBM launchings and has provided significant data on Soviet missile tests.[186]

The Nike-Zeus, an antiballistic missile program, had been initiated by the Army in 1956. It was a straightforward attempt to use existing technology for the design of a nuclear-armed rocket for the purpose of intercepting incoming warheads.[187] Nike-Zeus essentially died in 1959, but careful review on a year-by-year basis always resulted in a determination to

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[184] Ibid.

[185] Englebardt, S. L., Strategic Defenses, Thomas Y. Crowell Co., New York, 1966, pp. 107-108, 110.

[186] Greenwood, op. cit., p. 16.

[187] York, op. cit., p. 193.

continue with research and development. The program was revised in 1961 as Nike-X and eventually grew into Sentinal, and finally, Safeguard.

G. SOVIET EFFORTS TO BUILD A MYTH

The predominant view held in the United States in late 1957 was that the new Soviet rocket force had a counterforce doctrine which was intended to one day catch the entire SAC bomber force on the ground. A devastating Pearl Harbor-type grand first strike could thus decisively defeat the United States. The actions taken by the United States after Sputnik would undoubtedly rule out such a plan if in fact it ever existed. Nevertheless, Soviet claims of tremendous missile achievement continued to foster the wide-spread belief in the United States of a menacing threat posed by Soviet missiles. Irrefutable evidence of Soviet successes coupled with an ever increasing tendency on the part of Khrushchev to boast of Soviet missile prowess moved the United States from the "bomber gap" into the "missile gap."

Only three days after Sputnik I, Khrushchev told James Reston of the New York Times, "We now have all the rockets we need: long-range rockets, intermediate-range rockets, and

short-range rockets."[188] After Sputnik II Khrushchev became even more verbose. At a reception of All-Union Congress of Soviet Journalists he boasted that if attacked, the Soviet Union could "wipe our potential enemies off the face of the earth." He further stated that he had recently visited a plant which had in one year produced "250 rockets with hydrogen warheads."[189] He also informed William R. Hearst, Jr. that "the Soviet Union has intercontinental ballistic rockets with hydrogen warheads," and further bragged to Hearst that they had a stockpile of at least twenty ICBM's with nuclear warheads ready for launch at any given minute.[190] To give credence to some of what now might seem to be wild, irresponsible statements, Khrushchev boasted of the power of Soviet rockets, stating they could "double or more than double the weight of the satellite, because the Soviet intercontinental rocket has tremendous power . . . ." On January 26, 1958,

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[188]This statement was considered important because of its reference to sufficiency in all three types of missiles but not numbers of any specific type. Khrushchev's early statements on Soviet space successes, while exuberant, were controlled and ambiguous, meant to communicate misleading hints about Soviet strength. This was the pattern followed for the remainder of the decade. (Horelick, A.L., and Rush, M., Strategic Power and Soviet Foreign Policy, R-434-PR, Rand Corp., Santa Monica, 1965, pp. 64-65.)

[189]Khrushchev openly stated missiles were being mass produced on a production line basis as early as 1957. With 250 rockets produced at a single plant in one year the obvious implication was that there was a sizeable stockpile of these weapons at a time when the U.S. first deployed strategic ballistic missile, Thor, was still a year away. (Aviation Week, Nov. 30, 1959, vol. 71, no. 18, p. 34.)

[190]Horelick and Rush, op. cit., pp. 65, 67068.

he was proven to be right when a 2925 pound Sputnik III went into orbit.[191]

Given the obvious Soviet technology in the field, backed up by these exorbitant claims, it is easy to see why the United States public could so easily believe a "missile gap" existed. What is not so obvious is why the Soviets, still smarting from the results of similar, irresponsible bomber propaganda campaign, would so willingly launch another such program. It is possible that the initial Soviet missile-space successes and United States' failure had encouraged the Soviet leadership to believe such a disparity really did exist and would for some time to come. The sanctioning of large increases in Soviet research and development expenditures in 1958 could have manifested a convention that technological momentum thus acquired could be converted into concrete advantage before a significant response could be generated in the United States.[192]

A more generally accepted explanation holds that the Soviet claims and tests were intended to project a general

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[191] In addition to the obvious advantage accrued to the Soviets in launching the first satellite, Khrushchev attempted to establish satellite weight as the criterion for establishing power in the missile race. (Ibid., pp. 66-67.)

[192] The importance of projecting the image of missile superiority whereby space spectaculars took presidence over military requirements was paramount. This approach caused considerable contention between military planners who did not want "to hand over their precious rockets for launching sputniks" and those carrying out Khrushchev's injunction to devote available resources to getting a man into space first. (Wolfe and Ermarth, op. cit., pp. 52n, 53n, 53.)

impression of power where none really existed. Khrushchev possibly felt that political profit could be derived from the image of Soviet missile power before such power was actually acquired. The Soviet bomber program's failure to substantially improve their intercontinental delivery capability strongly supports this latter hypothesis. As has historically been the case the Soviets totally disregarded the possible impact this approach might have on the American public and governmental decision makers.

Unlike the United States who developed a small warhead before developing a missile to carry it, the Soviets built their initial missiles around their existing large warheads.[193] As a result, the SS-6, the Soviets' first ICBM, proved to be much too heavy to be dispersed away from the Trans-Siberian railroad, needed to transport and service it, or to be put underground in protective silos. Additionally, the missile was tremendously expensive. It utilized a very unstable liquid propellent making it impossible to maintain in any state of readiness.[194] The huge booster rocket offered a distinct advantage, however, in lofting heavy payloads into space.

Monitoring efforts by the United States indicated that Soviet long-range missile testing in 1957 and 1958 had become

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[193]Adams, op. cit., p. 11, 11n.

[194]Murphy, "Khrushchev's Paper Bear," op. cit., p. 228.

infrequent and increasingly sporadic, indicating the Soviets had encountered technical problems. By 1958 Defense Department officials had begun to slip back the estimated date on which the SS-6 would become operational.[195] These first generation missiles were cumbersome and expensive, and for that reason the Soviets appear to have made the decision in 1958 or 1959 to limit production of the SS-6. Like the United States, the Soviets decided not to produce this missile in quantity but rather to proceed with the development of second generation missiles.[196] Despite the alarm which the SS-6 caused in the West, it did not become operational until about 1960.[197] Earlier intelligence estimates had predicted as many as 1500 Soviet ICBM's, but by that date they had only 14 of the big missiles in place.[198]

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[195]Seven squadrons of Thor and Jupiter missiles were produced for overseas deployment. These missiles were eventually to be deployed in Alaska, Okinawa, Guam, Formosa, and the Philippines in addition to those sites in Europe. Intelligence reports indicated Soviet missile programs were not progressing as rapidly as exaggerated estimates had indicated. When estimates of the operational date of Soviet missiles had slipped from six months to a year the urgency of placing interim ICBM's in overseas bases subsided. In October 1959 the United States announced there would be no further Thor or Jupiter overseas bases. (Armacost, op. cit., pp. 212-215.)

[196]Bottome, The Missile Gap, p. 77n.

[197]Wolfe and Ermarth, op. cit., p. 268, Murphy, op. cit., p. 228.

[198]In September 1961 estimates credited the Soviet Union with 14 ICBM's. This came after further evaluation of SAMOS II pictures and recovery of several subsequent Discoverer capsules. (Greenwood, op. cit., p. 10.)

From 1956 to 1960, the United States conducted some thirty deep penetration U-2 flights into the Soviet Union.[199] The same photography which had conclusively ended the "bomber gap" served to dispell much of the fear of a "missile gap." Photography consistantly showed fewer deployed Soviet missiles than had been expected and brought about a continual downgrading of estimated Soviet missile strength.[200] In December 1959, the United States and the Soviet Union each had only about ten combat-ready ICBM's.[201]

Gary Powers and his U-2 were downed on May 1, 1960, and aerial intelligence gathering was temporarily halted. Earlier that same year, Khrushchev had intimated that the Soviets were well aware of the U-2 flights, but that U-2's had not flown over areas where the Soviet ICBM's were located. He further stated that the mammoth SS-6 was easily camouflaged and could avoid detection even if overflown. These claims were repeated after the downing of the U-2.[202]

SAMOS II was launched in 1961 and began its satellite inspection of the Soviet Union. Six days later the new Secretary of Defense, McNamara, ended any remaining vestige

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[199]Murphy, "Khrushchev's Paper Bear," p. 227, Quester, op. cit., p. 192.

[200]Quester, op. cit., p. 193.

[201]Horelick and Rush, op. cit., p. 98.

[202]Ibid., pp. 99, 115.

of official "missile gap" doubt when he told the press that evidence now revealed that no "missile gap" existed.[203] The vulnerable SS-6's previously pinpointed by the U-2 overflights had proven to be the entire arsenal of ICBM missiles.

The Soviets appear to have produced only about four percent of the ICBM's intelligence sources estimated they were capable of building.[204] By the fall of 1961, the United States began to express strong confidence in its superiority in the missile field, and Khrushchev had long since ceased claiming overall military superiority.[205] A "missile gap" truly existed then, but as in the case of their ill-fated "bomber gap" projection, it was the Soviets who faced the numerical disadvantage.

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[203] Greenwood, op. cit., p. 10.

[204] Bottome, The Balance of Terror, p. 41.

[205] Khrushchev now talked about the "necessary" quantity of nuclear bombs but said nothing about the quantity of rockets available, only that they were the world's most powerful. (Horelick and Rush, op. cit., p. 127.)

VI. SUMMARY OF STRATEGIC INTERACTIONS

The period 1945 through 1961 is one of periodic, intense, bipolar competition between the United States and the Soviet Union. It was characterized by the Soviets working from a position of strategic inferiority and taking compensatory actions which were seen as challenges to the strategic superiority of the United States. The United States in return, consistantly reacted in an almost paranoaic manner to such challenges. Interactions were exacerbated by what appears, in retrospect, to have been irresponsible threats and boasting by Soviet leaders about nonexistant weapons in their arsenal. These statements were generally backed up by just enough tangible evidence to make such claims appear to be possible.

Issues were further clouded by Soviet secrecy which made their strategic capabilities and intentions a great uncertainty to the West. It was never possible to tell whether the Soviets were moving toward supremacy or simply a position of deterrence. Additionally, the Soviet leadership never fully appreciated the extreme dangers in pursuing any strategic arms escalation given the American sensitivity to possible threats to its position of strategic superiority.

Each of the four periods discussed between 1945 and 1961 represents a time in which either a major event such as the Korean War in the 1949-1953 period or some major strategic weapons system dominated the reaction phenomena.

1945-1949

In the first period from 1945 to 1949 there can be little doubt that the Soviets were determined to have nuclear weapons and break the nuclear monopoly of the United States. The sizeable lead enjoyed by the United States in nuclear technology had a tremendous influence on their decision. The "coincidental" timing of Western and corresponding Soviet actions, such as the successful chain reaction experiments at the University of Chicago in 1942 followed shortly by a rejuvinated Soviet research program seem to go beyond mere happenstance. The order to accelerate the Soviet developmental program following the Alamogordo test, and the eventual arrest of Soviet nuclear scientists for failing to achieve sufficient results all point to the tremendous influence the program in the United States had on Soviet nuclear development. This ultimately proves to be one of the more classic cases of a response to a major technological breakthrough with impetus coming as the direct result of nuclear weapons development in the West.

Parallel development of a long-range bomber force and nuclear weapons was a clear indication of their intent. The influence of the United States and the urgency felt by the Soviets in this period is further exemplified by their liberal "borrowing" from Western technology. The case of the TU-4 reproduction of the B-29, the need to utilize the British-made Rolls Royce engines in the MIG-15, and the heavy reliance upon captured German technicians and technology in their early air defense and jet engine development efforts illustrate this.

Despite the fact that they were almost totally lacking in tactical experience, facilities, and technical expertise, a major portion of their postwar economy was directed at acquiring a strategic bomber force. Their goal was a bomber force which, if not equal to that of the United States, was of sufficient strength to pose a serious threat to Western Europe and counter the American presence there.

In the area of air defenses, the nuclear monopoly of the United States combined with the delivery potential of its strategic bomber force to pose a substantial threat to the Soviet Union. From the outset the Soviets responded directly to this threat. Their massive postwar air defense efforts are an even more glaring and one sided example of a reaction to a posed threat. The Soviet's initial efforts to remedy shortcomings in air defense of the homeland were tremendous. Competitive aircraft design programs yielded the famed MIG-15, built in massive quantity to meet the interceptor needs. Extensive efforts were exerted to advance the Soviet expertise in the field of electronics, producing their own early warning and tracking radars by the early fifties--both deemed essential in the face of the United States' nuclear strike force.

For the most part, the United States did not react with the decisiveness of the Soviet Union, but react it did. SAC was formed in 1946. It was expanded in 1947, but no major impetus was gained until a series of political crises in 1948 brought about a fear of imminent war. Early 1949 saw

SAC reach a new high for this period with 21 bombardment groups, but the "buy" decisions for SAC in this period were not directed at matching or countering any Soviet weapons system.

The United States' air defense system decisions were only slightly different, at least until late in the postwar period. Virtually no air defense existed prior to 1948. Even though there was an Air Defense Command, it lacked substance. The few early warning radar stations it had at its disposal were in operation only on a part time basis. Once again the political situation was the driving force behind its 1948 expansion. (It should be remembered that the TU-4 could not reach the continental United States on a roundtrip mission.) Not until after the Soviets acquired nuclear weapons did the United States enter into a hardware action-reaction arms race.

1949-1953

The Soviet nuclear blast on August 29, 1949 signaled the end of the nuclear monopoly era and ushered in a new period--one which would be dominated by the Korean War. This period represented a time of substantial change within both the United States and the Soviet Union. In the context of weapons interaction there is little question that the Soviet nuclear detonation triggered a rapid and large-scaled reaction in the United States.

Detection of the Soviet blast brought about the first three U. S. responses to the development of a Soviet strategic weapon. There was an almost instantaneous call, initiated by Admiral Strauss, for work to begin on the development of a

"Super" or hydrogen bomb. Shortly thereafter a group began a strategic appraisal based on present commitments and the existing strategic situation. Their report, NSC-68, defined a continuing military and economic threat. Finally, the deterrent muscle of SAC was expanded with Congressional appropriations and authorization for the purchase of 155 more B-36 intercontinental bombers.

By early 1950 the effects of these three reactive initiatives had begun to manifest themselves. The H-bomb decision had been announced by President Trumna in January, by March NSC-68 was published, and the necessary budgetary recommendations were being processed. SAC continued to expand as more B-36's and B-50's were delivered.

Efforts were still relatively low keyed and had not yet gained real momentum, if they ever really would have, when the Soviet-engineered attack on South Korea came. This attack exacerbated the slow moving programs in the same manner as had the 1948 political crises and spurred the United States into a massive rebuilding program. The developmental program of the "Super" did not experience the acceleration of the other programs because of its long lead time requirements and relative infancy, but the Korean conflict did serve to silence many of its critics. NSC-68 was then taken very seriously, and on its recommendations, Congress expanded defense spending by more than a threefold increase. SAC received even more emphasis as the primary deterrent force, and subsequent studies recommended the

development of a massive, three-tiered radar early warning and interception system to assure its protection.

For the most part the Soviet Union did not respond to the expansion or development of new weapons in the United States in this period beyond the continuation of previously initiated programs in air defense and bomber development. One might well argue that the Soviet hydrogen bomb development was in response to the announced intentions of the United States to develop the "Super." Existing information and historical fact simply cannot support such a thesis, however. They detonated an advanced device relatively early and developed a deliverable weapon ahead of the United States. Only three nuclear tests preceded their first thermonuclear detonation which lends strong credence to the belief that they had made a very early decision to strive for such a weapon.

Technological advances within the Soviet Union allowed for the development of an effective but very thin early warning system in the eastern portion of the country. This was little more than an expansion of the 1946-initiated radar air defense system. Jet engine development led to better point-defense fighters, and made possible the Soviets' first truly intercontinental bombers. The increased emphasis in bomber development probably came more as a result of the Soviets acquiring a nuclear capability of their own and the need to have some means of delivery, than because of some action initiated by the United States.

This period was characterized by an apparent reversal of the interaction roles from the earlier 1945-1949 period with the United States reacting to Soviet developments at a time when the Soviets seemed to react little to U.S. developments. The reactions of the United States were then accelerated by political outgrowths of the Korean War.

1953-1957

Both powers came out of the Korean War significantly effected. It was this experience which caused the lines of the Cold War to be more sharply drawn as the intense bipolar competition which characterized the period began.

The Eisenhower Administration placed new emphasis on the economy and slowed or halted those military programs concerned with conventional force build-up. President Eisenhower's New Look policy stressed the need for a balance between a strong military and a strong economy. But after the Soviet thermonuclear blast on August 12, 1953, the National Security Council gave the New Look explicit direction through NSC-162/2 and its resulting policy of massive retaliation.

While NSC-162/2 may have received emphasis with the Soviet thermonuclear explosion, the driving force for its adoption still remained an intense desire on the part of the new administration to strengthen the economy. It was felt this could be achieved by cutting conventional force funding to the bone and relying almost totally on a nuclear deterrent.

A more positive reaction to the Soviet hydrogen device was to manifest itself in air defense efforts in the United

States. In early 1953 authoritative sources were crediting the Soviets with a quantity of new long-range bombers, the TU-200 and the IL-38. Even though these reports later proved to be erroneous they served to alarm air defense advocates. This alarm was then shared by others when the Soviets detonated their first thermonuclear device that same year.

United States fears that it was losing its immunity to nuclear attack and the Soviet thermonuclear achievement caused programs which had been discussed but not funded to receive the necessary budgetary support. Work quickly began on the three-tiered radar early-warning system deemed necessary to give adequate warning of a pending bomber attack. This program was accelerated because of a later Soviet bomber build-up projection, and interim programs were initiated to fill short term radar coverage needs.

While this was obviously a reaction to a perceived Soviet bomber threat the air defense program in the United States never took on the magnitude of its counterpart in the Soviet Union. It was the greatest reaction by the United States to this date.

By 1953 three other new Soviet bombers were in production. The MI-4 Bison and the TU-95 Bear were both considered to be long-ranged bombers. The TU-16 Badger was credited with a medium range capability comparable to that of the B-47. These aircraft all appeared in numbers in the 1954-1955 May Day Parade fly-overs, some two years ahead of their estimated schedule.

Intelligence estimates of Soviet bomber production capability caused United States planners to conclude that a "bomber gap" would soon exist unless immediate, remedial measures were taken. In response a massive B-52 and KC-135 tanker production program was initiated. The perceived threat to American strategic superiority upon which deterrence of the Soviet Union depended had been countered.

In this first of several gap phenomena of the fifties, the United States overreacted--a pattern which was to be followed again and would only serve to widen the true disparity already in existence. This was uniformly to the disadvantage of the Soviet Union.

With the beginning of the "bomber gap" experience in 1954-1955 the United States also accelerated existing missile programs and created others. Thor and Jupiter IRBM development began as did the Titan ICBM program, a back up for Atlas. In 1955 the Killian Committee reported that the strategic balance would be in jeopardy by the "early 1960's" if the United States missile program was not accelerated. Also in 1955 an extensive series of IRBM tests was begun in the Soviet Union and monitored by the United States. Shortly thereafter the Soviets detonated their first air-dropped thermonuclear weapon, and it appeared the predictions of the Killian Committee might be running well ahead of schedule.

Although missile research and development had long been underway it had only just started reaching the feasibility stage in the mid-fifties, therefore, technological drive alone

could not begin to account for the reaction of the United States. Seeing a Soviet threat, the immediate reaction was to accelerate the one existing ICBM program, provide it with a back-up, and made an all out effort to get something out immediately. Thus, Thor and Jupiter were only interim fills with state-of-the-art technology. This is another example of the response which rapidly became characteristic of the United States when faced with a challenge to its strategic superiority.

In the aftermath of the Korean War the new Soviet regime faced many difficult problems. Aside from the domestic power struggle which ensued following Stalin's death, the Korean War had brought about a rapid expansion of SAC in the United States. In response to the growing air defense needs, PVO was made a separate service. A clear indication of the perceived threat imposed by SAC was the tremendous allocations of resources to PVO in this period--over half a million men and eventually $75 billion. Additionally, efforts to acquire a good all-weather interceptor and a day fighter superior to the MIG-15 and MIG-17 were accelerated.

The expansion of SAC when coupled with the development of a hydrogen device clearly gave a renewed emphasis to Soviet air defense efforts. Even in the absence of thermonuclear weapons PVO expansion on the magnitude experienced would probably have occured. The Korean War had shown the vulnerability of the piston-driven bomber, but the deployment of the B-47 to forward bases made much of the old air defense

system and concepts obsolete. Changes were essential to keep pace with technology. Nevertheless, there can be little doubt that the expansion of SAC was the driving force behind the reorganization of PVO and the reallocation of resources to it in an effort to upgrade the Soviet air defense system.

Bomber development in this time frame showed a considerably less causal relationship than did air defense. While evidence strongly suggests that the Soviet Union undertook a crash bomber developmental program, it is doubtful that it did so to counter the expansion of SAC. More likely the impetus came from nuclear weapons development and a technological break-through in jet engine design in the Soviet Union. With a deliverable nuclear weapon and the promise of a thermonuclear weapon, engine technology finally provided an adequate means for delivery. If the Soviets were to have a credible nuclear deterrent of their own, it was imperative that they develop a delivery system capable of constituting a valid threat. Such development was given a very high priority.

The same might be said about Soviet missile development. Soviet interest in missile development roughly paralleled that of the United States. As with the bombers, evidence indicates that the IRBM and the MRBM developmental programs were probably given a crash priority. At the height of their early testing, they were firing five missiles a month and were in series production of the SS-3 and SS-4 in 1956.

These missiles constituted no threat to the continental United States but their deployment threatened Western Europe

and the overseas SAC bases. Additionally only the medium ranged TU-16 was ever produced in significant number, and it too was incapable of reaching the United States. Given that both of these weapon systems were deployed against Europe and once deployed the Soviets began to cut back conventional forces, it became clear that Europe was still the hostage to be used to deter the United States.

While this marked a change in Soviet strategy--nuclear deterrence vice conventional deterrence--it did not transpire as a response to a Western nuclear build-up, but rather evolved as the most economical means to achieve an end. The inferior position of the Soviet Union in nuclear striking forces was the driving factor which caused the acceleration of both programs.

The period 1953-1957 is then marked by an increase in strategic competition but for different reasons. The United States was clearly the more reactive of the two parties as defense planners consistently used worst case analysis. A strong pattern of reaction to threats to its strategic superiority emerged and was exacerbated by exuberant claims of Soviet nuclear prowess. The Soviets, on the other hand, reacted strongly in the area of air defense, but developments in bomber and missile technology appear to have been more evolutionary, receiving impetus from the Soviet's strategically inferior position.

By the time this period nears its end, a common tendency, present earlier but not so obvious, begins to solidify. Both

sides were now giving the highest priorities to expanding and perfecting strategic deterrence capabilities. Although the basic deterrence concepts differed because of the actual delivery capabilities of their strategic forces, the effect was the same. Neither side seemed willing to trade Paris for Moscow. The Soviets continued to hold Europe hostage, though by this time it was with nuclear weapons. Still unable to strike the United States, the deterrent capability of the Soviet Union had shown only qualitative improvement.

Thus we come to the fourth and final period--1957-1961. In this period the interactive pattern of the previous four years continued with little change. Those programs initiated earlier by the Soviets continued toward completion, and the United States was again stampeded into another massive building program.

1957-1961

In 1957 the "bomber gap" had not fully subsided when a second and ultimately more dangerous gap, the "missile gap," was perpetrated by the Soviet Union. Twice within the same decade they made exactly the same mistake with identical results--overwhelming United States strategic superiority of an even greater magnitude than before the incident.

There is little question that the United States was the more reactive of the two powers in this period. For the first time the Soviet Union enjoyed a brief lead in a major field of advanced technology. Soviet successes and premature

attempts to use "missile diplomacy" served to convince the American public and many of the decision-makers in the United States that the strategic superiority of SAC could soon be nullified.

Threatened by a Soviet verbal overkill, the United States undertook many different crash programs in missile development. Four intercontinental-range ballistic missiles and one submarine launched ballistic missile emerged--Atlas, Titan I, Titan II, Minuteman I, and Polaris. In addition, two IRBM's Thor and Jupiter, were developed using current technology to allow for their rapid overseas deployment. By throwing its overwhelming resources into such development, the United States rapidly closed what appeared to be a "missile gap." In reality the crash programs probably were not needed and, whatever small initial advantage the Soviets might have enjoyed quickly vanished. The familiar superior-inferior relationship in strategic capabilities established early in the post-World War II era was reaffirmed.

From the very beginning the Soviets demonstrated an apparent lack of concern or understanding of how their actions would affect the United States. As in the earlier period which had so dramatically worked to their disadvantage in producing the "bomber gap," the Soviets appear to have taken calculated steps designed to give an illusion of missile superiority to conceal their weakness in strategic weapons systems. This gave their large conventional forces greater credibility to meet all but nuclear aggression, and was a partial answer to the "massive retaliation" policy of the

Eisenhower Administration. The "missile gap" endeavor differed from that of the "bomber gap" only in that the Soviets demonstrated an initial superiority in this system. The result was, once again, an escalation of the arms race in which the Soviet Union was either unwilling, or more probably, unable to compete with the United States on equal terms.

With an appearance of superior strategic capability, Soviet leadership accrued to itself a more powerful bargaining position in world politics. Their apparent willingness to play the charade to the fullest was an extremely dangerous game, however. Khrushchev's overacting with his "rocket rattling" and missile boasts in many respects played into the hands of those advocating an even stronger strategic position for the United States. Partisan politics further fostered the fear of the Soviet menace.

When the "missile gap" scare was finally dispelled, the Soviets were not only facing a larger bomber deficit, they also faced an ever widening missile deficit. What few missiles they had were of the highly vulnerable, first generation variety. The Soviets were in a worse position than ever before.

VII. CONCLUSIONS

Throughout the entire period examined, from 1945 to 1961, one principal tendency was exhibited by both powers. This was the high priority both gave to strategic deterrence. In the early period this was a one-sided endeavor because of the United States' monopoly in nuclear weapons. Not until the Soviets developed nuclear weapons of their own were they able to play an effective role in this deadly game. The priorities of strategic deterrence became exaggerated as thermonuclear weapons came into being.

Considerable differences in strategic deterrence concepts emerged which were primarily the result of the economic and technological base from which the two worked.

While no single pattern of strategic interaction seems to have emerged, one distinct characteristic became manifest. From the outset the United States held a sizeable margin of strategic superiority. The Soviet Union was the challenger, compelled to try to match the strategic weapons of the United States. Unable to compete effectively on this level, the Soviets were forced to engage in a facade designed to project an image of power. The United States consistently reacted strongly even when enjoying a decisive weapons margin if the perceived threat was to its strategic superiority. The result was always the same--overwhelming United States strategic superiority.

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